

A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

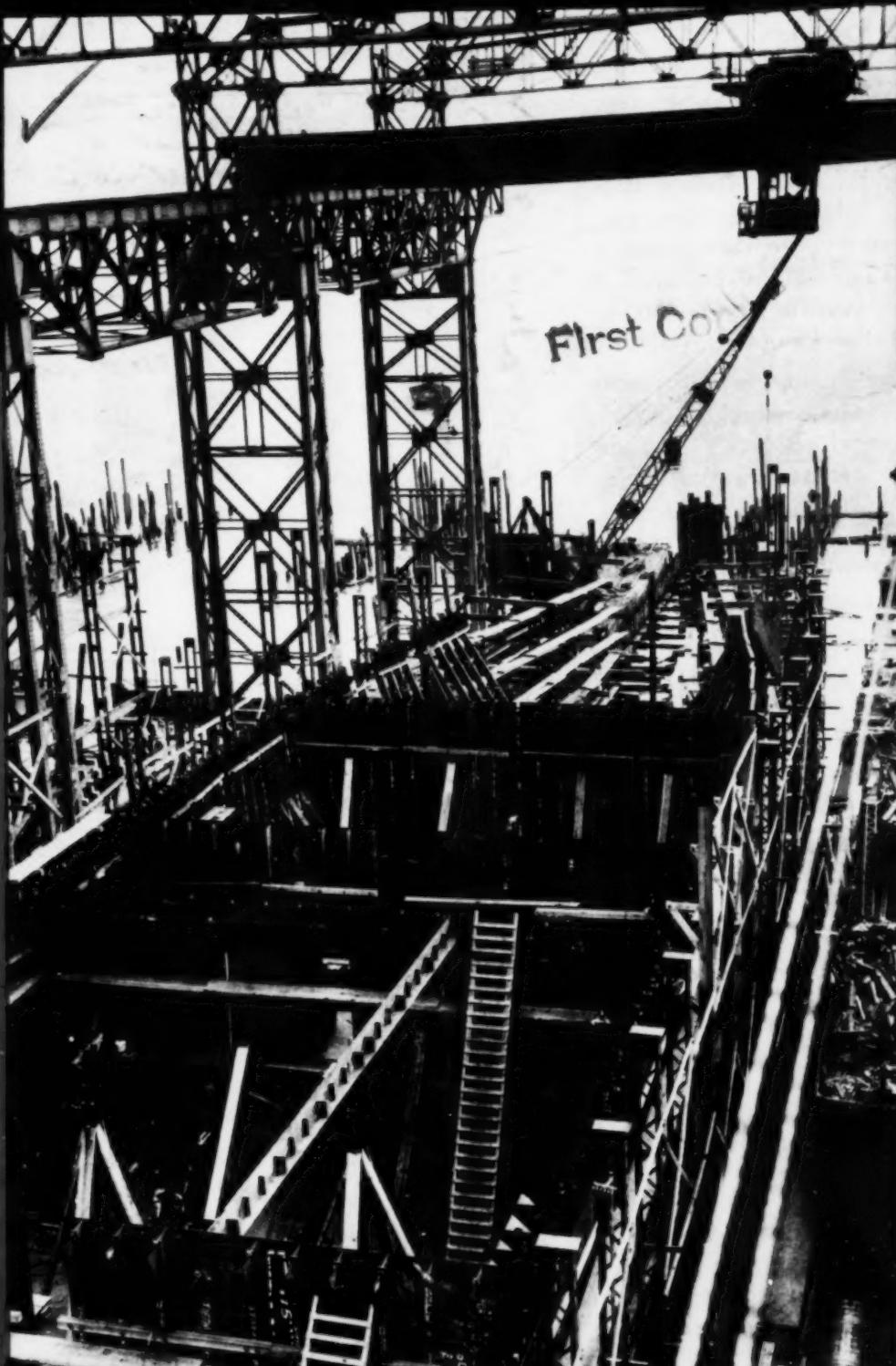
MCGRAW-HILL
PUBLISHING
COMPANY, INC.
PRICE 20 CENTS

OCTOBER
1941

SHIPWAYS
built at rate of one every
two weeks for U.S. Maritime
Commission, required
driving of 45,000 timber
piles, assembling 5 million
feet of lumber and placing
6,000 cu.yd. of concrete.

DEMOUNTABLE HOUSES
for workers on defense
projects are pre-built in
central yard of Tennessee
Valley Authority for ship-
ment and speedy erection
on site.

STEEL HULL of cargo vessel
rapidly takes shape on newly
completed ways in Baltimore
yard, where shipway con-
tractors set fast pace for ship-
builders.

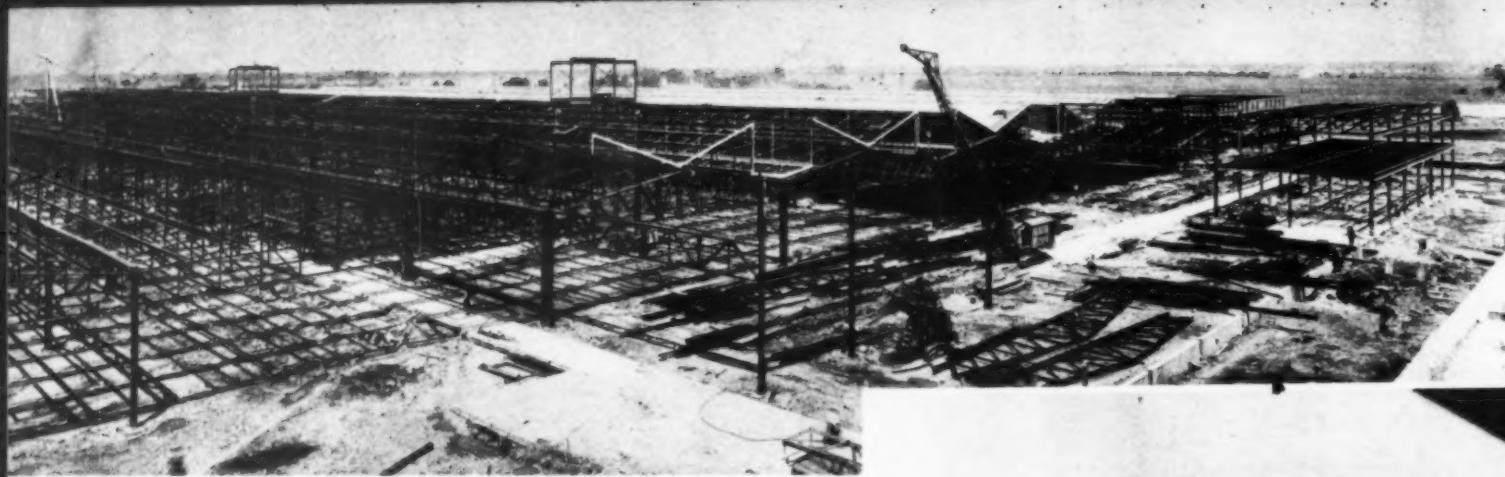


"BLACKOUT" PLANT
without windows, is steel-
frame structure with cantilever trusses erected in
three sections.

ARMY CAMP CONSTRUCTION
at Fort Custer, Mich., re-
quired nearly one thou-
sand buildings of various
types and sizes.

NAVAL AIR STATION
at Jacksonville, Fla., in-
volves diverse construc-
tion by 4,500 workers on
\$25,500,000 cost-plus-fixed-fee project.

RUSH CONSTRUCTION
completes 16-story
concrete storehouse
in 10 months, saving \$100,000
over original budget.



A thousand airplane motors a month will soon be streaming from Buick's new plant.

Steel from INLAND Helps Build Buick's Chicago Aviation Plant

Less than a year ago Inland was almost wholly engaged in making steel for normal commercial uses. Today, it is quite different. Inland with the same loyal spirit shown by the vast majority of industry throughout the country, is doing everything within its power to advance the Defense Program.

That is why Inland rushed from its mills more than 5,000 tons of steel for fabrication into buildings for Buick's Airplane Motor Works at Melrose Park, Illinois. This enormous plant, now nearing completion, will employ 10,000 workers who will machine, assemble, and test 1,000 Pratt & Whitney motors a month.

This is typical of many new and urgent demands for tonnage coming to Inland in a steadily increasing volume. Inland knows that National Defense is its No. 1 Job and its business is being managed accordingly.

However, after satisfying these needs we are, to the best of our ability, proportioning our remaining steel equitably among our many customers who are engaged in non-defense industries.

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATE STRUCTURALS PILING
TECHNOLOGY DEPT. RAILS TRACK ACCESSORIES REINFORCING BARS



A 1200-hp. twin row aviation motor such as will be built by Buick.

INLAND STEEL CO.

Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

CURRENT JOBS

... and Who's Doing Them

BUILDINGS

Public—In Alexandria, Va., War Department awarded \$35,000,000 contract for office building to **Doyle & Russell** and **Wise Contracting Co.**, of Richmond, and **John McShain Inc.**, of Philadelphia, Pa. **S. A. Healy** and **M. J. Boyle & Co.**, of Chicago will build shell and bomb-loading plant, known as Illinois Ordnance Plant, in Carbondale, Ill., for War Department at cost of \$27,000,000. Magnesium plant is under construction in Nevada by **McNeil Construction Co.**, of Los Angeles, Calif., for \$21,000,000, including utilities. A \$20,000,000 War Department contract for shell-loading plant in Parsons, Kan., went to **Peter Kiewit Sons Co.**, **George W. Condon Co.**, of Omaha, Neb., and **Paschen Bros. Construction Co.**, of Chicago, Ill., on cost-plus-fixed-fee basis. Successful bidders for contract to build armored division cantonment in Santa Maria, Calif., were **MacDonald & Kahn, Inc.**, of San Francisco, and **J. F. Shea Co., Inc.**, of Los Angeles, for \$17,382,682. War Department awarded contract for anhydrous ammonia plant in Louisiana, Mo., for Hercules Powder Co., to **Bechtel-McCone-Parsons Corp.**, of Los Angeles, Calif., for \$16,750,000 on cost-plus-fixed-fee basis.

A. Farnell Blair, of Decatur, Ga., received contract to construct armored division camp near Fort Smith, Ark., at cost of \$15,512,786. In Freeport, Tex., **Austin Co.**, and **M. K. Kellogg Co.**, of Houston, were low bidders for synthetic ammonia producing plant contract, with bid of \$11,000,000; Defense Plant Corp. will finance. **Austin Co.**, of Cleveland, Ohio, will build a main assembly building, warehouse, office building, etc., for Boeing Aircraft Co., in Renton, Wash., at estimated cost of \$10,000,000, to be financed by Defense Plant Corp. In Huntsville, Ala., chemical shell assembly plant will be built by **C. G. Kershaw Contracting Co.**, of Birmingham, **Engineers Ltd.**, of San Francisco, Calif., and **Walter Butler Co.**, of St. Paul, Minn., at total cost of \$4,606,000. Bell Aircraft Corp., of Niagara Falls, N. Y., awarded contract for additional plant buildings to **Austin Co.**, of Cleveland, Ohio, at estimated total of \$4,300,000, to be financed by Defense Plant Corp.

HEAVY CONSTRUCTION

In Mobile, Ala., 8 shipways, shops, etc., are under construction by the **Alabama Shipbuilding & Dry Dock Co.**, of Mobile, for \$8,000,000. Low bidders for Granby Dam and dikes contract in Colorado were **W. E. Callahan Construction Co.**, **Gunther & Shirley Co.**, **Peter Kiewit Sons Co.**, and **George W. Condon Co.**, of Los Angeles, Calif., with bid of \$5,247,555. U. S. Maritime Commission awarded contract for 4 shipways and shops in Los Angeles, Calif., to **Consolidated Steel Corp.**, local contractor, for \$4,000,000. U. S. Maritime Commission awarded another contract for shipways in Richmond, Calif., to **Richmond Shipbuilding Corp.**, local contractor, for \$3,000,000. **Caye Construction Co., Inc.**, of Brooklyn, N. Y., submitted bid for air base contract in Presque Isle, Me., at estimated cost of \$3,080,000.

In Victoria, Tex., air base is under construction by **American Friedman Bitulithic Ass'n.**, of Houston, for \$1,932,838. **Haley, Chrisholm & Morris, Inc.**, and **Gilbert Construction Co.**, of Charlottesville, will build railroad for Navy Department in Virginia, at cost of \$1,350,000 on cost-plus-fixed-fee basis. An airport in Ottawa, Ont., Canada, is being built by **McNamara Construction Co., Ltd.**, of Toronto, for approximately \$1,000,000. Low bidder for contract to build runways at Wright Field, Dayton, Ohio, was **Price Bros. Co.**, local contractor, with bid of \$1,560,000.

HIGHWAYS AND BRIDGES

Among recent highway and bridge contract awards are the following: Florida: \$724,000 to **M. J. Carroll**, of Leesburg, Illinois: \$205,787 to **Hurden Construction Co.**, of Springfield, Kentucky: \$219,258 to **R. H. Walters**, of Elizabethtown; \$589,432 to **Mt. Vernon Bridge Co.**, of Mount Vernon, Ohio; \$246,231 to **Foster & Creighton Co.**, of Nashville, Tenn., Missouri: \$244,889 to **F. Weber, Jr.**, of St. Louis, Minnesota: \$309,810 to **Central States Construction Co.**, of Duluth, Michigan: \$302,368 to **Loselle Construction Co.**, of Wyandotte, Mississippi: \$220,003 to **Chandler Brothers**, of Virgilina, Va., Pennsylvania: \$1,115,958 to **Ralph Myers Construction Co.**, of Salem, Ind.; \$664,140 to **Baldwin Brothers Paving Co.**, of Cleveland, Ohio; \$227,373 to **Putman & Greene, Inc.**, of Fort Wayne, Ind.; \$303,104 to **Ryan Bros., Inc.**, of Westfield; \$261,273 to **F. D. Kessler, Inc.**, of Northumberland; \$392,544 to **Galier Bros.**, of Cleveland, Ohio; \$260,970 to **D. D. Mullett**, of Aspinwall; \$558,110 to **S. T. Brotemarke Construction Co.**, of Cumberland, Md.; \$541,433 to **A. B. Cole**, of Meshoppen; \$343,954 to **Allegheny Asphalt & Paving Co.**, of Pittsburgh.

A steel truss bridge in Philadelphia, Pa., is under way by the **Phoenix Bridge Co.**, of Phoenixville, for \$1,165,000. Successful bidder for Cheesecake Creek Bridge contract in New Jersey was **Felhaber Pile Co.**, of New York City, with bid of \$942,893. In Maryland, a reinforced-concrete substructure bridge over Potomac River will be erected by **James McGraw Co.**, of Philadelphia, Pa., at price of \$270,625. **Briggs & Genczi Construction Co.**, of New York City, will be constructing a crossing under tracks of Maine Central R. R. in Fairfield, Me., for \$203,975.

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OCTOBER, 1941

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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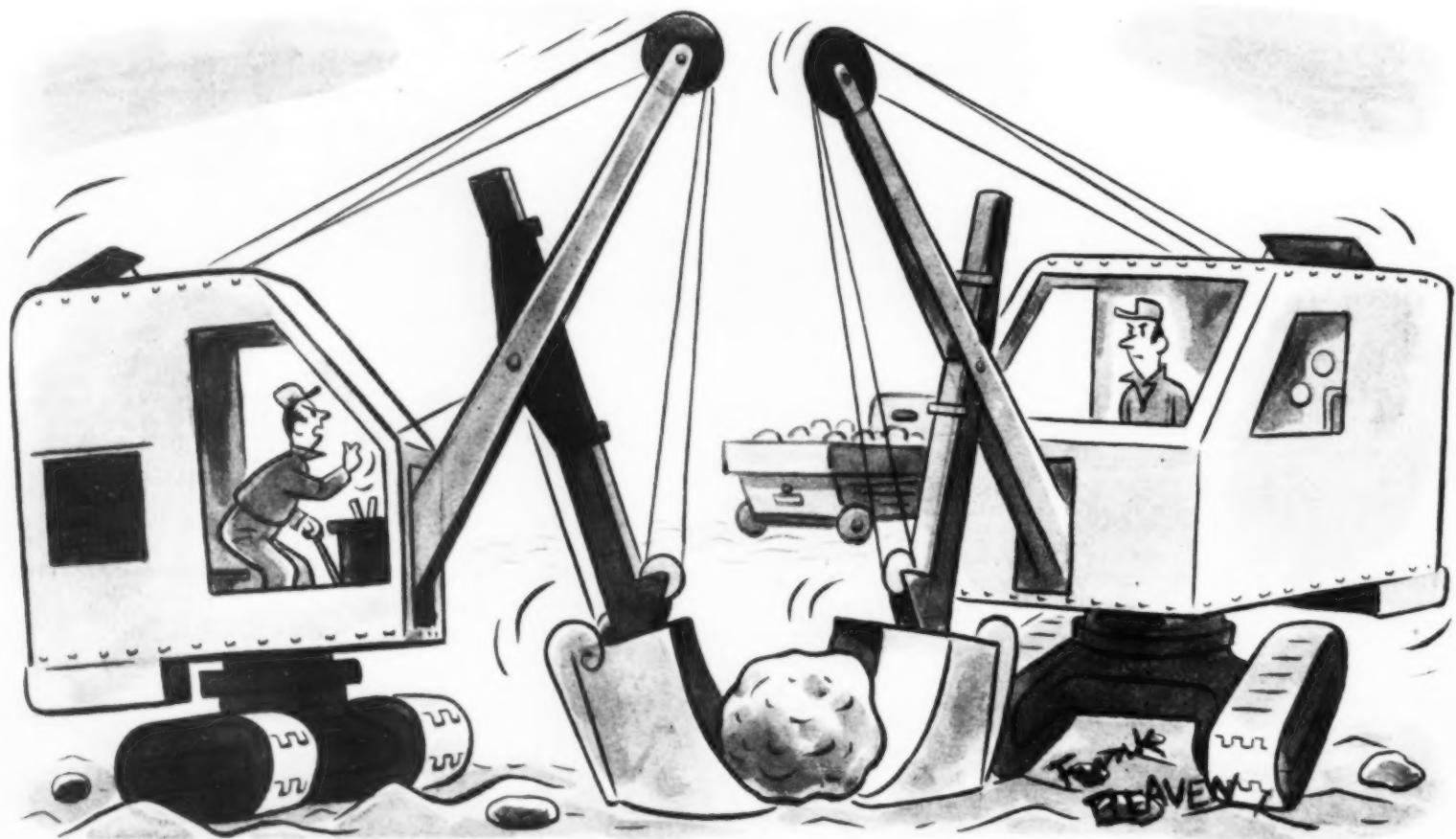
The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

- How **BELT CONVEYOR LOADING STATIONS** were built in water-filled gravel pit. —p. 39
- How **16 SHIPWAYS** were constructed at average rate of one every two weeks. —p. 42
- How **STEEL PLATE CAPS**, spiked to butts, protected timber piles during driving. —p. 43
- How **AIR-POWERED HOIST** pulled piles into line for stay-lashing. —p. 43
- How **TRUCK-MIXER** poured continuous concrete footing for crane-way rail. —p. 46
- How **TROLLEY-BEAM SWING CRANE** on truck distributed materials at construction site. —p. 46
- How **CANTILEVER TRUSSES** were erected at windowless blackout plant. —p. 48
- How **TIMBER CONNECTORS** were used in fabricating trusses for Naval Air Station building. —p. 51
- How **HEAVY TRUSSES** spanning subway tubes were lowered into river at bridge piers. —p. 54
- How **CONCRETE STOREHOUSE** at Navy Yard was built in 48 days. —p. 55
- How **STABILIZED GRAVEL BASE** at Army camp was laid by tamping-leveling machine. —p. 56
- How **MOBILE TRACTOR-CRANE** laid 48-in. diameter concrete pipe in trench. —p. 58
- How **LOADS OF BRICK** were deposited in neat piles by special body on truck. —p. 58
- How **SPECIAL YOKE** on cable from crane handled steel reinforcing bars 113½ ft. long. —p. 58
- How **ROLLING TENT** protected concreting of bridge roadway. —p. 59
- How **PORTABLE BELT CONVEYOR** placed earthfill in timber barricade. —p. 59
- How **ABANDONED STREET CAR RAILS** were cut and removed with aid of oxyacetylene torch. —p. 59
- How **DEMOUNTABLE SECTIONAL HOUSES** were prebuilt in central yard. —p. 62
- How **PONTOON BRIDGE** was built across river by Army engineers. —p. 65
- How **SPEEDY CONCRETING** was done on 13-story building erected in 37 days. —p. 67

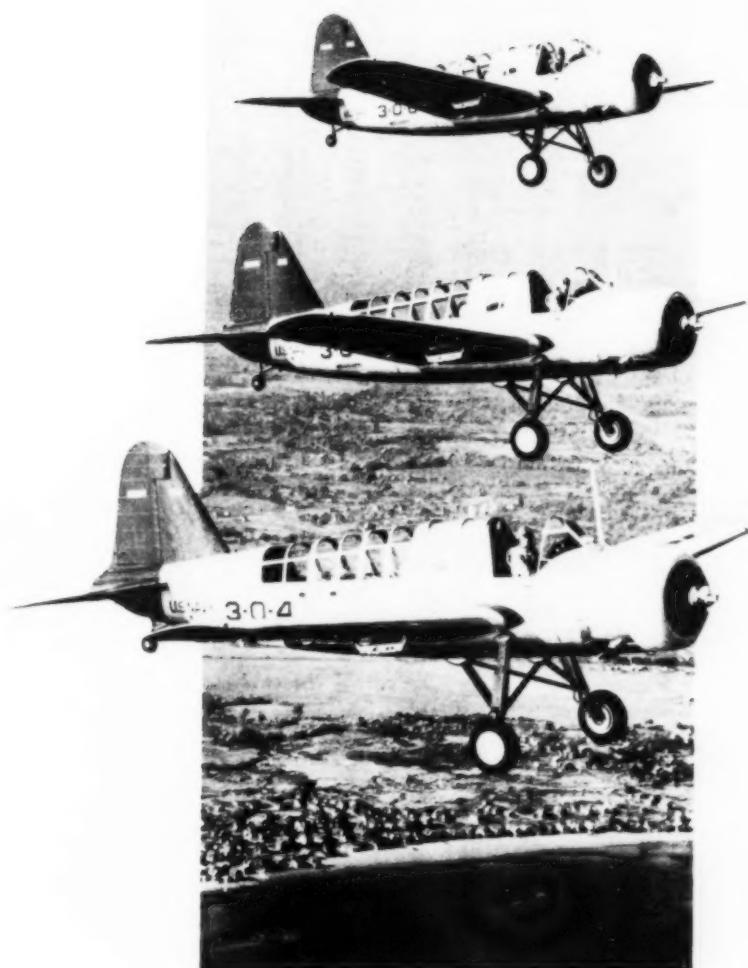


"Ben's won three prizes in photo contests since we've been working across from the Tivoli."



"I saw it first!"

'SQUADRONS UP'



**-UP DAYS SOONER,
BECAUSE OF 'INCOR'**

TODAY'S emphasis is on speed and more speed, in planes—and in building construction. New plant of United Aircraft's Vought-Sikorsky Division, Stratford, Conn., built with Lone Star and 'Incor', was completed in record time.

Heavy-Duty Floors 8 Days Sooner

Heavy-duty floors were built with 'Incor'. 'Incor' floor-topping, placed one day, is ready for use the next, saving 6 to 8 days on each pour—and producing strong, durable, non-dusting floor surfaces. Dependable 24-hour service strength means top speed in concrete-frame erection. Result, 'Squadrons Up!'-up, days and weeks sooner, because of 'Incor'.

Use 'Incor'* 24-Hour Cement for extra speed at minimum cost—get quality concrete, backed by 14 years' outstanding performance. Write for copy of "Heavy-Duty Floors." Lone Star Cement Corporation, Room 2264, 342 Madison Avenue, New York.

*Reg. U. S. Pat. Off.

Used for heavy-duty floors, 'Incor' helped speed operations in new factory addition, Vought-Sikorsky Division, United Aircraft Corporation, Stratford, Conn. Architect-Engineer: Albert Kahn, Inc., Detroit. General Contractor: Edwin Moss & Son, Inc., Bridgeport, Conn. Vought-Sikorsky scout observation planes, shown above.



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WE RENEW OUR PLEDGE

Two years ago, at the beginning of the present war with its uncertainties and threats to the future of all industry, this Company publicly pledged itself not to increase its selling prices.

On this, the second anniversary, we again publicly renew that pledge.

During the last two years we have not only kept the pledge previously made, but *we have actually reduced our selling prices by more than 5%* because of more efficient operation made possible by the marvelous cooperation and ability of our organization. This was accomplished in the face of rising labor and material costs, both of which have been increased by considerable amounts.

It is our belief that the only hope for the continuance of the present industrial system now threatened from within and without is in its ability to give more and more to the consumer for less and less of his dollar. This is the strength of American individual initiative. This is the hope of our country's future. If American industry can accomplish this universally, we need not fear dictators either at home or abroad.

THE LINCOLN ELECTRIC COMPANY

Cleveland, Ohio
October 2, 1941

A cursive signature in black ink that reads "J. F. Leuerle".
President

Volume leads to Victory

On National Defense projects where the first problem is to move mountains of earth and rock in the shortest time with the fewest men, more and more contractors and engineers instinctively turn to Rear-Dump and Bottom-Dump EUCLIDS for the toughest parts of the jobs . . . Here's just a few of the many projects where the outstanding performance and dependability of EUCLIDS greatly boosted overall job speed and efficiency:

	Euclids
Pearl Harbor Naval Air Base, Hawaii Contractors, Pacific Naval Air Bases	15
New Castle Airport, Delaware Dutcher Construction Corp.	14
Jefferson Proving Grounds, Indiana J. C. O'Connor & Sons, Inc.	8
Fletcher Airport, North Carolina Asheville Contracting Co.	5
Fort Leonard Wood, Missouri K-N-W-L Construction Co.	41
Gatun Locks, Panama Canal Zone M. Wunderlich — Okes Construction Co.	22

	Euclids
Fort Bragg, North Carolina E. W. Grannis	5
Hillsgrove Airport, Rhode Island M. A. Gammino Construction Co.	8
Airports at Wichita, Santa Fe and Stillwater List & Clark Construction Co.	8
Curtiss-Wright Plant, Robertson, Missouri Joseph Keel Rental Equipment Co.	3
Memphis Supply Depot, Tennessee Wilson-Walters-Prater Co.	8
Fort Devens, Massachusetts Coleman Brothers Corp.	8

THE EUCLID ROAD
MACHINERY COMPANY
CLEVELAND, OHIO



EUCLID

SELF-POWERED
EARTH-ROCK-COAL-GRE
HAULING EQUIPMENT

CRANE WAGONS • ROTARY SCRAPERS • TAMPING TOOLS





1. Before the blast



2. There she goes!



3. All set for the shovels

From SOLID ROCK to TRACK BALLAST (55,000 cu. yds. of it)

... with **ATLAS** Explosives!

YOU may have seen a bigger shot than this—but seldom a more effective one. Rock laid neatly at the foot—and with just the desired fragmentation—deserves credit in any quarry. Credit here goes to Sharp and Fellows Contracting Co., who engineered the blast at Sais, New Mexico. Using Atlas Explosives throughout, Sharp and Fellows were more than pleased with the results—especially with the speed with which the explosives loaded.

This is the type of performance you too can enjoy—ask your Atlas Representative for a demonstration.

(PHOTOS BY FERENZ FEDOR STUDIOS, ALBUQUERQUE, N. M.)

ATLAS

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"Everything for Blasting"



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of Northwest design and
construction has ever failed
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in a range
of 18 SIZES
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and
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NORTHWEST

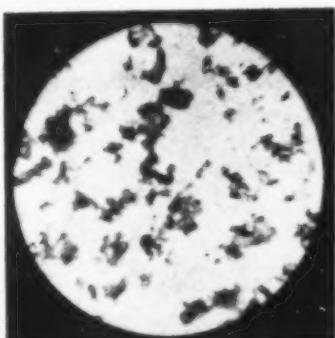
If it's a
real Rock Shovel
you won't have
to worry about
output in dirt

THIS IMPORTANT TECHNOLOGIC ADVANCE NOW ASSURES—

1. Concrete of Given Strength at Lower Cost 2. Stronger and More Durable Concrete at a Given Cost

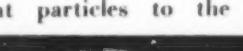
The discovery by the Master Builders' Research Laboratories of a practicable cement dispersing agent and its incorporation in Pozzolith made possible, for the first time, the application of dispersion to all types of hydraulic cement.

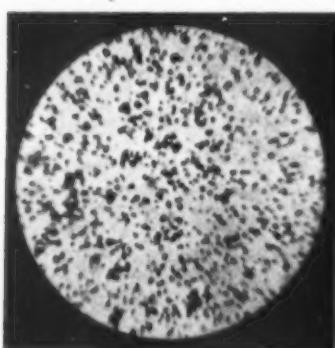
Cement particles in their normal state in water tend to gather in bunches; i.e., flocculate. Water never reaches some particles and many are only partly hydrated. This reduces the effectiveness of the cement, entraps water within the clumps, requires an excess of water for placement and often results in bleeding and segregation. See photomicrograph at right.



UNDISPENSED

With Pozzolith the dispersion principle operates to drive each particle apart, thus exposing all the cement particles to the vital hydrating action and consequently assuring increased efficiency. See photomicrograph at left.





DISPERSED

This dispersion, a revolutionary advance in construction practice, makes the cement usable to far greater efficiency since all the water is made available for lubrication of the mix, and the entire surface area of the cement is exposed for hydration.

ONLY A PART of the cementitious value of the cement, whether normal portland or high early, is utilized under usual construction conditions. Investigation shows that with 28 days curing only 50% of the cement hydrates. Even with 90 days curing only 60% of the cement hydrates. [Anderegg and Hubbell, A. S. T. M. 29 II 554 (1929)].

Since strength is a function of the degree of hydration, it is immediately obvious that increased strength is related to increased hydration.

Cement Dispersion applied through Pozzolith increases the degree of hydration of the cement from 30% to 40% which is fully confirmed by corresponding increases in strength.

LOWER INITIAL COST

Inasmuch as the requirements of design and of specifications are based on the strength of concrete at 28 days, Pozzolith concrete mixes under the dispersion principle take full practical advantage of the potential value of cement and hence are far more economical.

This has been conclusively proved by the savings made in thousands of yards of Pozzolith concrete placed since 1930. Facts, detailed, on request.

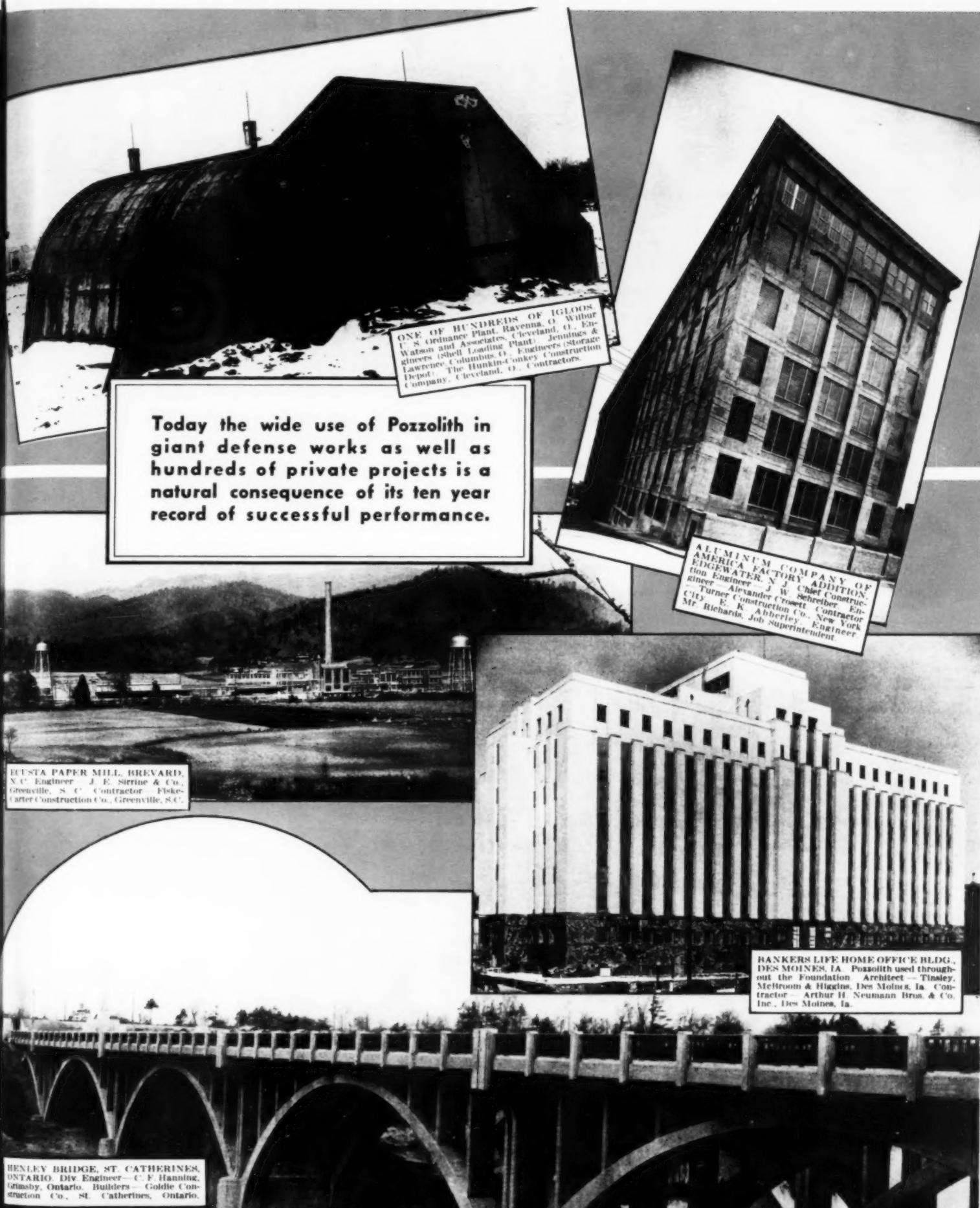
SPEED FOR DEFENSE

Greatly increased placeability and high early strength with Pozzolith result in speeding up the job, producing further substantial savings.

The complete story of Cement Dispersion and Pozzolith and how it "puts all the cement to work" will be sent on request.

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In the U. S. A.—The Master Builders Company, Cleveland, Ohio



MASTER BUILDERS



Modern Aggregate Plants

...by

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Like hundreds of Telsmith plants all over the world, these new rock crushing and gravel washing plants have operated smoothly, efficiently and profitably right from the start. Most of them are operating on defense work, where the production pressure is tremendous. A Telsmith plant means the latest in equipment—crushers to bin gates—Telsmith-designed-and-built for extra staying power, greater flexibility and capacity, lower operating and upkeep costs. And Telsmith *Balanced Engineering Service* and centralized responsibility fits that plant to your own particular needs. Write for Bulletin EP-10.



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Dublin, Va.

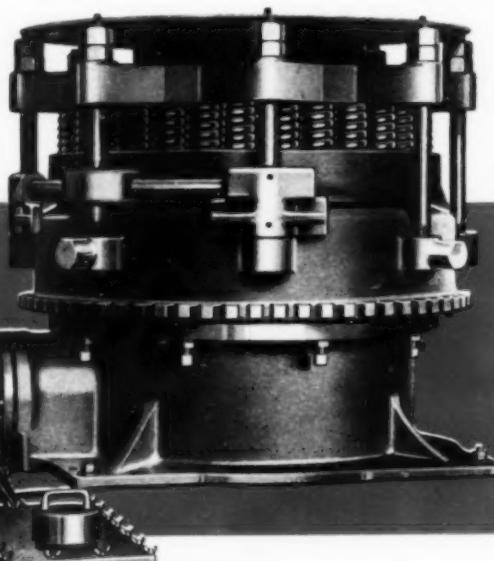


Crystal Concrete
Products Co.
Braintree, Mass.



Callan Construction Co.
Wickford Junction, R. I.

TELSMITH
GYRASPHERE
CRUSHER



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Gravel Co.
Richmond, Va.



Arundel Corporation
Woodbury Quarry
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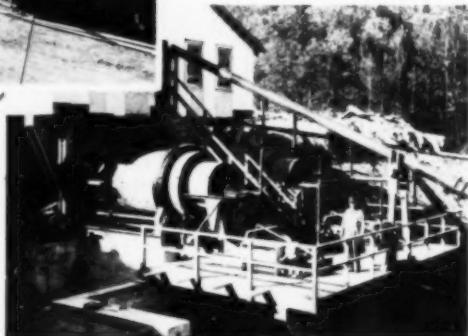
Boston Sand & Gravel Co.
East Greenwich, R. I.



Rossoff Sand & Gravel Corp.
Kerhonkson, N. Y.



Banks Stone & Sand Co.
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than any excavator you ever ran. Ask
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From the first, there was never a doubt about this greater strength of P&H's rolled alloy steel construction. But it had to be proved. And it has been!

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because ATLAS HIGH-EARLY was on the job!



No time lost on this construction job for Northwestern University's new Technological Institute when cold weather set in! Read what happened!

THE CONTRACTOR started work on this building in the summer, using Universal portland cement. But when winter arrived—with its freezing temperatures—he switched to Atlas High-Early cement.

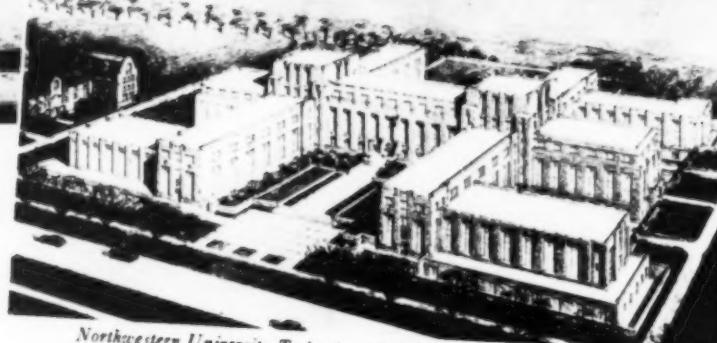
RESULT? Cylinder tests were made each day Atlas High-Early concrete was placed. Strengths obtained permitted early removal of forms, which enabled the contractor to maintain the same construction schedule during the cold winter months as during the warm summer months.

You too will find that Atlas High-Early Cement will help speed up your jobs and help you save time

and money. For this cement gains working strength rapidly. It cuts time and costs required for protection and curing as much as 60% to 70%. It often permits earlier stripping and therefore earlier re-use of forms, thus reducing form costs. And it produces serviceable concrete in much less than usual time. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

OFFICES: New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

CM-H-28



Northwestern University Technology Building, Evanston, Ill. Architects: Holabird and Root; Contractor: R. C. Wieboldt Co.—both of Chicago.

ATLAS HIGH-EARLY CEMENT

A UNIVERSAL ATLAS PRODUCT



→ ROCK OR MUD can't stop job progress

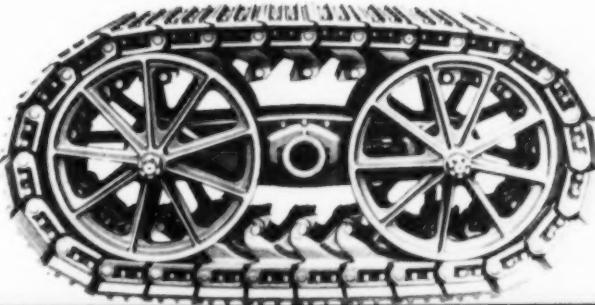


ATHEY FORGED-TRAK EQUIPMENT

Adverse ground and weather conditions cannot be allowed to halt job progress! For time is the essence during these days of vital defense projects.

On such important jobs, where delays must be avoided, many contractors overcome the serious hazards which confront ordinary hauling equipment by using Athey Forged-Trak Trailers. With the wide track that distributes weight over a great area and lays a firm road over rock or mud, ice or snow, Athey equipment keeps loads moving with the certainty that means steady production and earlier job completion.

For full information, see your "Caterpillar" dealer, or write us for Bulletin No. 701.



ATHEY
TRUSS WHEEL CO.
5631 West 65th St., Chicago, Illinois
Cable Address: "Trusswheel", Chicago

Mr. Contractor, in times like TO THE HIGH COST RISKS OF



**Today, one breakdown of a cut-price
than the price of a dependably-built
Tomorrow, you'll NEED the thousands
that protect JAEGER users from RISK of**

OVER 6 MILLION new automobiles and trucks bought for protection against uncertain prices and substitute materials give you the tip-off:

- (1) Now, while you've got the work, the money and often an advantage in priorities, replace old, slow and worn equipment with modern, high production units. (America needs your fastest production for defense. Tomorrow, you'll need it to stay in business.)
- (2) When buying, look for the HEAVY DUTY CONSTRUCTION that insures LONGEST POSSIBLE SERVICE without replacement or repairs. ("Cut price" equipment, containing substitute materials, can't give you this protection.)
- (3) Do your buying thru an equipment dealer you can rely on for parts and service when you NEED them.

Over 100 Jaeger distributors, with complete parts and service in 120 principal cities, offer you DEPENDABLE, LONG LIFE EQUIPMENT, DEPENDABLY SERVICED. As manufacturers, we stand behind them to the limit of our capacity to supply the QUALITY of equipment that will SEE YOU THRU.

THE JAEGER MACHINE CO., 800 Dublin Avenue, Columbus, Ohio

SPEEDLINE BUILDING MIXERS with Machined Steel Drum Tracks and Automotive-Type Enclosed Transmission—All Sizes to 56S.

CONTRACTORS' HOISTS with "Touch Control" Giant Expanding Clutches, Anti-Friction Bearings, All-Steel Combined Side Frames and Base—All Sizes to 100 H. P.

TRUCK MIXERS in "HIGH DUMP" and "LOW CHARGE" Types—All Sizes to 8 Cu. Yds.

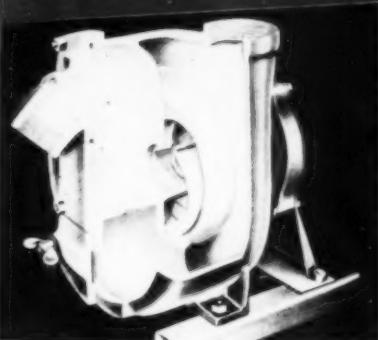
PAVING EQUIPMENT: World's Largest Manufacturer of Concrete and Bituminous Spreading and Finishing Machines.

Send for New Pump Catalog P-41, Showing LOWEST COST METHODS FOR HANDLING WATER—Small Jobs or Big

these, STOP, LOOK and LISTEN "CUT PRICE" EQUIPMENT!

SURE PRIME, FULL CAPACITY
and THOUSANDS of HOURS of EXTRA
PUMPING SERVICE CUT YOUR
REPLACEMENT RISK: McCarthy Im-
provement Co. reports 4 YEARS OF 24-
HOUR-A-DAY PUMPING with a Jaeger
River Dam work.

pump, can cost you more
and serviced JAEGER.
of hours of LONGER service
UNCERTAIN REPLACEMENT



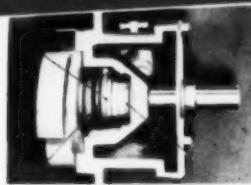
HI-PRESSURE SHELLS Built of Finest Close-Grained Semi-Steel or Alloys — Patented Self-Cleaning Design.

OVERSIZE SHAFTS AND BEARINGS

of Heat Treated Chrome-Nickel—the Only Moving Part.



HI-HEAD, HI-CAPACITY IMPELLERS built of steel in 4" to 8" sizes — Adjustable to compensate for wear.



"LONG-LIFE" SEAL: Jaeger was first to eliminate packing troubles from small pumps—offers you the only seal that is ACCESSIBLE FOR INSPECTION.

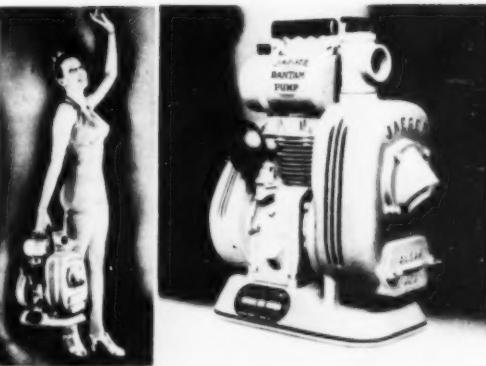
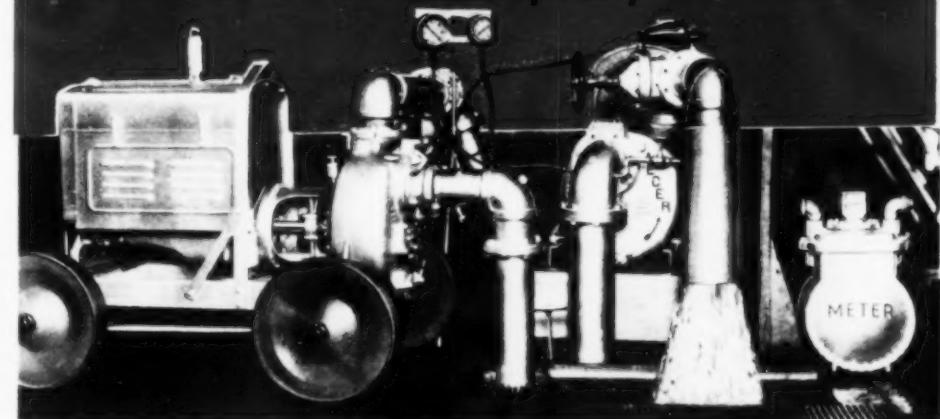


AND REPLACEABLE LINER PLATES in all 2" to 4" sizes, to save money, lengthen pump life.

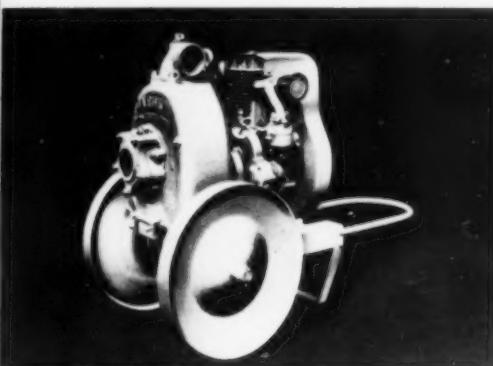


DIRECT DRIVE — PERMANENT ALIGNMENT: First pump to bolt shell solidly to engine with shaft on massive support bearing—eliminates "whip," adds life to pump and engine.

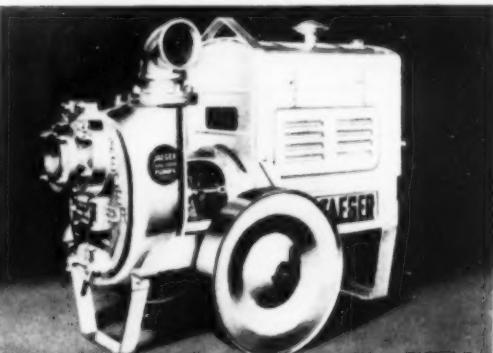
JAEGER "SURE-PRIME" PUMPS, ALONE, Offer You
This Construction in Pumps Individually Tested and
Certified for Vacuum, Capacity and Pressure!



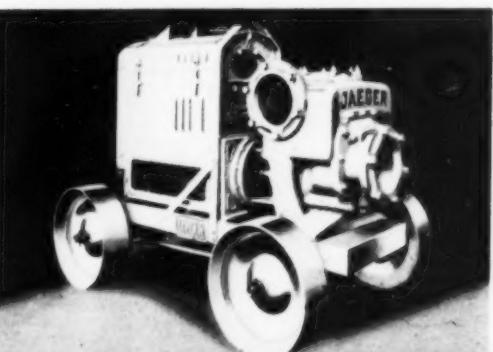
52 LB. "BANTAM": Recognized world's champion light pump of 3000 G. P. H. capacity. Gas or electric.



2" AND 3" SURE-PRIME PUMPS: Finest of small pumps—built for high pressures, continuous heavy service.



4" AND 6" PORTABLE PUMPS: Big capacity (up to 90,000 G. P. H.) and years of service in compact, easy handling units.



8" AND 10" HEAVY-DUTY PUMPS: Huge air and water capacity (125,000 to 240,000 G. P. H.) along with unequalled compactness and portability.

"MOVE IT!"



WHEN a 12-ton husky says "Move over!"—dirt gets out of the way. And it moves double-quick when the power back of the bulldozer is "Caterpillar" power!

Right across America, "Caterpillar" Diesel Tractors, Engines and Road Machines are licking the tough jobs — saving precious days and weeks in the all-out effort of defense.

Never before in the nation's history has time been of such vital importance as today. Roads must be built, airports cleared and graded, naval bases prepared, manufacturing plants expanded — all at a speed undreamed of even a year or two ago.

Wherever time is the essential factor, "Caterpillar" equipment comes to the front. The great dirt-moving and road-shaping capacity of these machines makes them indispensable to fast operation. And they're built throughout with the rugged quality and stamina to stay on the job — night and day if necessary — till the work is done.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

CATERPILLAR DIESEL

ENGINES AND ELECTRIC SETS • TRACK-TYPE TRACTORS • ROAD MACHINERY



OVER! "

Here's a job that will be finished right on schedule. A "Caterpillar" Diesel D7 Tractor, equipped with a LaPlant-Choate bulldozer, tears big yardage out of a side-hill bank, building a road.





GENERAL

keeps the trucks moving for
the Diano Supply Company of
Canton, Ohio. This is one of
three GENERALS operated by
this aggressive organization. Try
the GENERAL for real profit.

THIS GENERAL TYPE 30

with Twin Disc swing clutches, swings away
all day, and day after day, without clutch
trouble. If you have to do a lot of swinging
to keep the job moving, try a GENERAL
Type 30.

*Our new catalog sent
upon your request.*

The
OSGOOD
COMPANY

Sizes: $\frac{1}{2}$ to $2\frac{1}{2}$ Cu. Yd.
Diesel—Oil—Gas—Electric

Associated with
The **GENERAL**
EXCAVATOR CO.

The
HERCULES
COMPANY

HERCULES
IRONROLLERS
6 to 12 Tons
Diesel or Gasoline

Associated with
The **GENERAL**
EXCAVATOR CO.

GENERAL

Sizes:

$\frac{3}{8}$ - $\frac{1}{2}$ - $\frac{5}{8}$ - $\frac{3}{4}$ Cu. Yd.
Diesel—Gas—Electric



SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted

THE GENERAL EXCAVATOR COMPANY, Marion, Ohio



IN THESE DAYS when contractors' equipment is hard to get, prolong the life of your present open gears, chains and wire rope . . . protecting against undue wear and weather . . . by lubricating and coating them with **TEXACO CRATER**.

Crater is no ordinary lubricant . . . it clings tenaciously to fast-moving parts, quieting gear noise.

Crater penetrates wire rope to the core, reducing internal friction and wear, preventing rust and corrosion.

The outstanding performance that has made Texaco preferred in the fields listed in the panel, has made it preferred also on prominent construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

- ★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.
- ★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.
- ★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.
- ★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

 TUNE IN FRED ALLEN—Texaco Dealers invite you to enjoy Fred Allen in the full-hour program of "The Texaco Star Theatre" . . . with Kenny Baker, Al Goodman's Orchestra and a great cast. Every Wednesday night, Columbia Network, 9 E.S.T., 8 C.S.T., 7 M.S.T., 9 P.S.T.

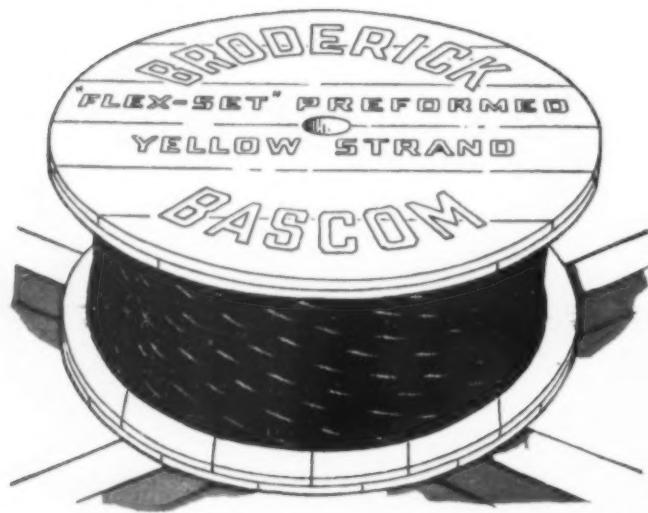


TEXACO Lubricants and Fuels FOR ALL CONTRACTORS' EQUIPMENT

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

SCRAPER PROFITS OFTEN "HANG BY A THREAD"

Cable



GIVE YOUR PAY LOADS THE SUPPORT OF TIME-TESTED **YELLOW STRAND**

On tightly-figured jobs, profit or loss may hang, thread-like, on the single factor of *cable* performance. That's why it's important to specify, and to be sure you get, "Flex-Set" Preformed Yellow Strand to replace worn ropes on cable controlled machines.

Experience in the field has proved how Yellow Strand helps secure peak production out of today's efficient scrapers. Speedier loading . . . more yardage per unit . . . fewer stops for repairs or cable changes — these are savings you can logically count on because the cable has been specially engineered for service on your equipment.

Every foot of time-tested Yellow Strand has been expertly balanced to combine elasticity, toughness, strength. Starting with highest quality steel wire, drawn to our rigid specifications, it is fabricated by up-to-date mechanized methods that climax 65 years of *exclusive* wire rope manufacturing. Both the wire rope center and the cable itself are *preformed* to make a limber, smooth-running line that is non-kinking, safe to handle and highly resistant to fatigue.

When you order cable — when you *reorder* it — don't run the risk of disappointment. Stick to the rope with the yellow strand. It's ready and waiting for you now at your nearby distributor's store.

BRODERICK & BASCOM ROPE CO., ST. LOUIS

Branches: New York • Chicago • Houston • Portland • Seattle

Factories: St. Louis • Seattle • Peoria

Distributors in All Industrial Centers

"ONE AND ONLY"

Cost-wise contractors and operators have positive ideas about scraper cable. That so many demand Yellow Strand as their "one and only" rope proves there's no substitute for the demonstrated economy of this veteran road worker.

Next time install long-lived Yellow Strand as specially designed in size, length and construction for your machines. You can't find a better team mate for

ALL-PURPOSE SCRAPERS
'DOZERS • RIPPERS • CRANES
And All Other Cable Controlled
Equipment

Replace WORN CABLE WITH
"FLEX-SET" PREFORMED YELLOW STRAND

LeTOURNEAU 'DOZERS

Move Rock, Uproot Trees
and Stumps, Keep Out of
Repair Shops



Punching a highway through the rocky Siskiyou Mountains, near Ashland, Oregon, with the toughest end of the work assigned to this LeTourneau Bulldozer and "Caterpillar" D8 tractor. Jobs like this used to be shovel work.

Le TOURNEAU Angledozers and Bulldozers enable you to profitably handle tough jobs like these because they're built for punishing conditions. LeTourneau alloy steel construction, are welded throughout, gives them maximum strength, minimum weight. Reversible cutting edge, replaceable tips, special heat-treated and hard-faced, further cut maintenance costs and lengthen equipment life. Result: LeTourneau 'Dozers today are the choice of contractors for the toughest jobs.

Operators like the fast response of LeTourneau 'Dozers . . . like the powerful high lift for clearing, uprooting stumps and pushing over trees . . . the instant low drop that enables the 'Dozer blade to follow loads over steep banks. LeTourneau cable control gives trigger-quick operation in any temperatures, whether it's in sizzling summer heat, or the sub-zero winter weather ahead of you.

Job proved by more than 8,500 LeTourneau 'Dozers now working on some of the toughest jobs throughout the United States, Canada and abroad. Models for all size "Caterpillar" tractors from the D4 up. See your LeTourneau-"Caterpillar" dealer NOW!



Montgomery and Conkey used this rugged LeTourneau Angledozer and "Caterpillar" D7 to carve truck roads through rocky terrain, near Coachella, California. In shale like this, LeTourneau 'Dozers dig in naturally—like a plow. That adds to traction, saves slippage.

Powerful LeTourneau Bulldozer and "Caterpillar" D8 tractor uprooting full-grown elm trees for public utility in Peoria, Illinois. Upward blade lift can be applied simultaneously with forward tractor shoe for added leverage to dig out stumps, trees, boulders.



Sidecasting rock on D. B. Hill's highway job, near Huff, Arkansas. Blade can be set straight for bulldozing—no extra bowl to mount. This is but one of three Angledozers Hill is using to handle rock, clay and sand. Two LeTourneau Carryalls handle the longer hauls.

LeTourneau Angledozer clearing stumps and side-hill rock for logging railroad grade, near Shevlin, Oregon. In the logging woods, where work like this is the toughest, LeTourneau 'Dozers outnumber all other makes combined!

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

CABLE ADDRESS: "BOBLETOÑO"

For Lowest Net Cost per Yard—CARRYALL[®], SCRAPERS, ANGLEDODZERS[®], POWER CONTROL UNITS, BULLDOZERS, ROOTERS[®], TRACTOR CRANES, PUSHDOZERS, Tournapulls[®], SHEEP'S FOOT ROLLERS, Tournatrailers[®], Tournacrane.
*Name Reg. U. S. Pat. Off.



3/8 TO 3 YARD CAPACITY

LINK-BELT SPEEDER

SHOVELS - DRAGLINES
CRANES

ANOTHER LINK-BELT SPEEDER CONTRIBUTION TO THE DEFENSE PROGRAM

Link-Belt Speeder Shovels, Draglines and Cranes are not only active in defense work over the country, but are doing a better, faster and more economical job of it.

Steel scrap is primary defense material. Sterling Iron & Metal Company of Sterling, Illinois, handles scrap speedily and economically with a Link-Belt Speeder crane with 45-ft. boom and 42-in. magnet. A special grapple is used for handling loose wire and large scrap.

Defense industries and projects requiring material handling by shovel, dragline or crane will profit by Link-Belt Speeder experience and equipment. Let us show you what we have "on the ball".



Part of a group of soldiers selected for an intensive training course in the most efficient defense use of their new Link-Belt Speeder $\frac{3}{8}$ yd. shovel.

LINK-BELT SPEEDER CORPORATION

Builders of the Most Complete Line of Shovels and Cranes

301 WEST PERSHING ROAD

CHICAGO, ILLINOIS



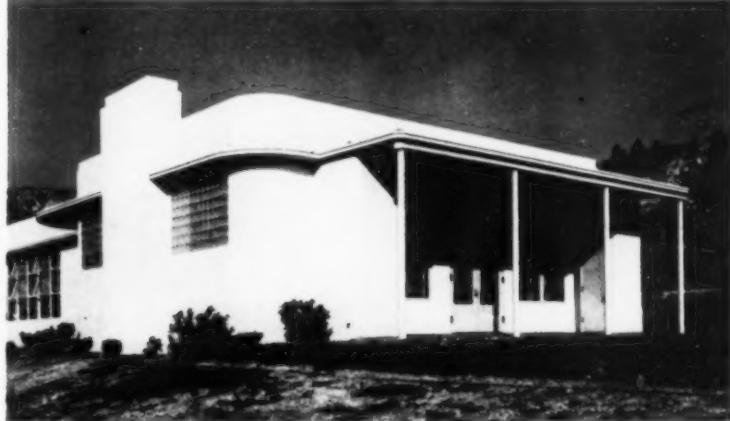
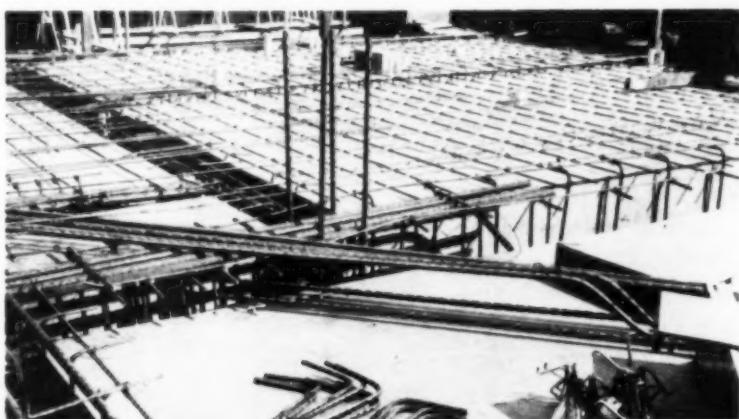
SMOOTH AS CONCRETE FORMED AGAINST **PLYFORM**

This concrete form grade of Douglas Fir Plywood serves as sheathing and lining combined

- When plans and specifications call for smooth exposed concrete surfaces, form them against Plyform — the grade of Douglas Fir Plywood made especially for concrete form work. Only special highly water-resistant premium glues and selected veneers are used in Plyform, in accordance with U. S. Commercial Standard CS45-40. The panels are sanded satin-smooth, oil-treated and edge-sealed at the mill. This means that they're ready to work for you the instant you receive them. And if you give them reasonable care, they'll give you numerous re-uses.

Every 4' x 8' Plyform panel covers 32 square feet — giving you full value for your form dollar. Plyform works easily with all tools and can be nailed without boring holes. Its combination of strength and light weight simplifies carpentry and handling. Because of its non-absorbent uniform surface, concrete formed against Plyform is not mottled, stained or colored. Joints and fins are absolutely minimized. Cost of rubbing labor is cut from 5c to 12c a square foot.

There are outstanding Plyform jobs in every part of the United States. See them . . . study them . . . and use Plyform on your next job.



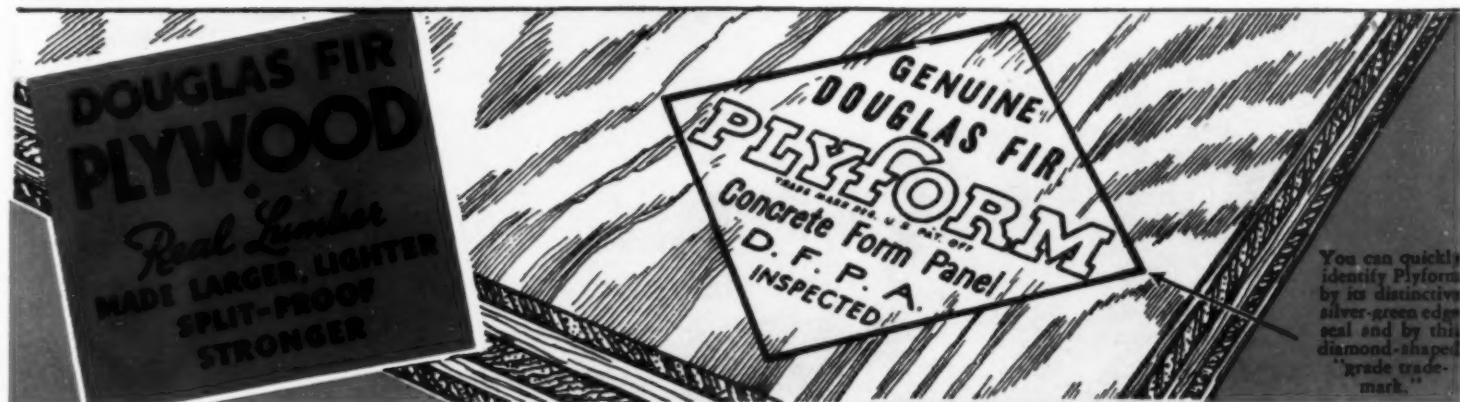
FLAT OR CURVED SURFACES can be formed equally well against Plyform. Proof is this detail from the beautiful Lou Henry Hoover School in Whittier, Calif. Wm. H. Harrison was the architect; J & B Construction Co., the contractor.



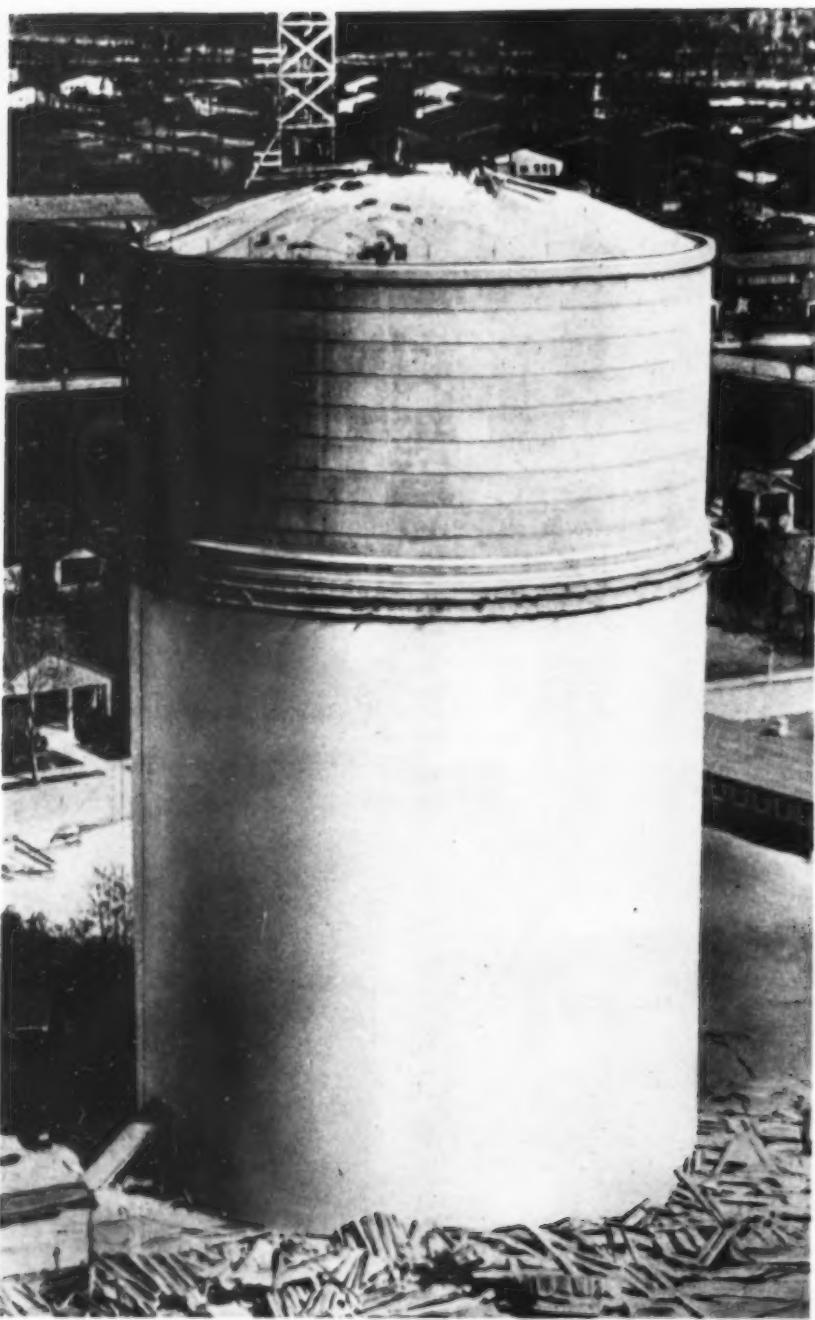
THE INTERIOR WALLS of the Lou Henry Hoover School were also formed against Plyform because they had to be flawless, too. There was no plastering. Paint was applied directly to concrete.

Left: PLYFORM FLOOR SLAB AND GIRDER FORMS in place ready for pouring at Marion Housing Project, Jersey City, N. J. Each panel covers 32 square feet, minimizing amount of form material needed as well as carpentry and handling. George Siegler Company was the contractor.

WRITE FOR FREE CONCRETE FORM BOOKLET. Contains complete data about Plyform. Douglas Fir Plywood Assn., Tacoma, Wn.



When the Army wanted water in a hurry...



WATER TANK, Fort Bragg, N. C.

CAMP CONTRACTOR: T. A. Loving & Co., Goldsboro, N. C.

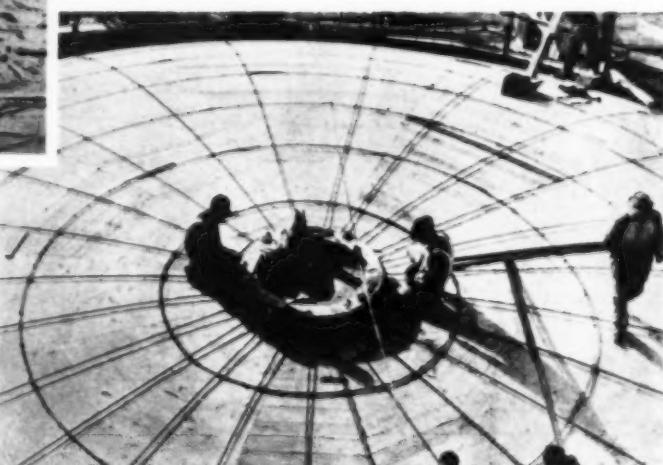
CONSTRUCTING ENGINEERS: Macdonald Engineering Co., New York City

ENGINEERS & ARCHITECTS: J. N. Pease & Co., Charlotte, N. C.

This is one of many jobs in which Lehigh Early Strength Cement was used, instead of normal cement, to cut both time and costs. It is a 1,000,000-gallon, all-reinforced concrete water tower built with the Macdonald system of moving form construction.

Bear in mind that Lehigh Early Strength Cement gives service concrete in one-third to one-fifth the usual time, reduces to a minimum the time spent waiting for it to harden. By using Lehigh Early Strength Cement in the 30" floor slab on which the tank rests, and in the tank's dome, the contractor was able to remove forms quickly enough to permit continuous construction.

All of the 2280 cu. yds. of concrete in this 1,000,000-gallon defense item were made with either Lehigh Normal or Early Strength Cement. The point to note, however, is the strategic use of the latter to keep construction going ahead without delay. You, too, can make savings in time and costs in your concrete work by figuring on Lehigh Early Strength Cement at strategic points.



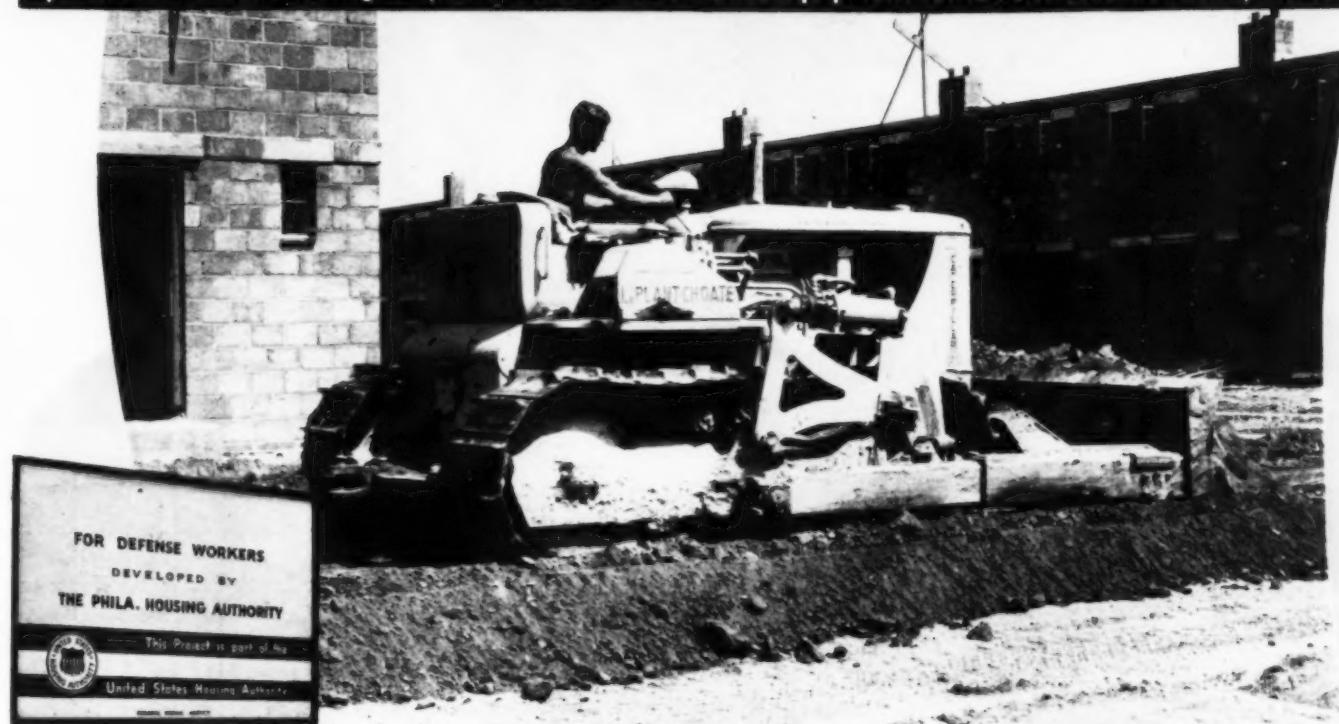
FORMING FOR DOME ROOF

Lehigh

EARLY STRENGTH CEMENT
for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

If you have an Earth-Moving Job, LAPLANT-CHOATE Builds Equipment for it . . . to save You Time, Effort and Money!



LAPLANT-CHOATE TOOLS "CATERPILLAR" TRACTORS



SEND FOR THIS FREE BOOKLET

Complete information on hydraulic Trailbuilders, Bulldozers, or other LaPlant-Choate equipment. See your nearest dealer.

A Team that Makes Molehills out of Mountains of Defense Work.... and in Record Time!

WHETHER the job is general earth-moving work like this Defense Housing Project in Philadelphia, or digging a new set of locks for the Panama Canal or an airport for Canada . . . it's all in a day's work for this husky combination.

LaPlant-Choate equipment hits the "bull's-eye" when it comes to performance, economy, and ability to "take it". Hundreds of Defense projects in the United States, Canada, and South America have proved the superiority of LaPlant-Choate tools. The biggest operators in the earthmoving industry all say, "LaPlant-Choate runs rings around all others" . . . and it does! Use LaPlant-Choate tools on your job!

LA PLANT-CHOATE MANUFACTURING CO. Inc.

CEDAR RAPIDS, IOWA . . . SAN LEANDRO, CALIF.



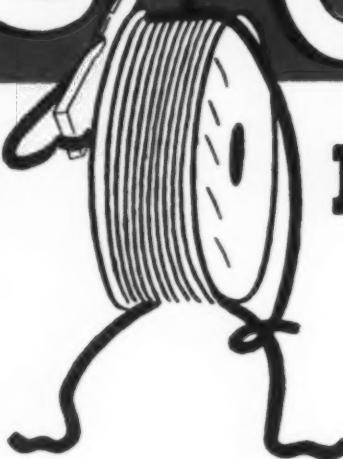
EARTH MOVING . . . LAND CLEARING . . . SNOW REMOVAL

Wire Rope

A DEFENSE

NECESSITY!

PROPER
INSTALLATION
ESSENTIAL



In the production of steel, coal, oil, lumber and other key industries producing for National Defense—Wire Rope is a necessity. Also, it is vital that these industries avoid delays and repairs—that they get maximum service from all equipment. Thus, for greater speed and efficiency, we recommend that inspections be made more frequently, and conditions governing the life of Wire Rope be studied more carefully at this time.

Worn Equipment Takes Life From Wire Rope

In an otherwise properly designed piece of machinery, there is nothing quite so detrimental to rope life as worn equipment.

As a rope is used, it becomes smaller from (1) the pulling down of the core allowing a further seating of the strands, and (2) from abrasion, wearing off some of the outer surface of the wires. Both reduce the diameter causing higher unit pressure of rope on sheave.

The sheave groove gradually wears smaller in diameter so that frequently the worn groove diameter is smaller than the next new oversized rope. The pinching effect of the worn groove on the rope is very detrimental, causing a restriction of strand movements which would otherwise adjust themselves while bending.

This cut shows the early failure of the rope because of excessive pinching, this rope lasting only 1½ hours under the usual operating stress.



NO GO

Besides wearing the groove, there is also the wearing of the sheave hub, causing a wobbling of the sheave, allowing flange wear on the rope, which might also throw out the rope reeving alignment.

Therefore, before installing a new rope, check all grooves with a set of groove gauges which are the actual size of the oversized rope. These gauges should seat all the way to the bottom of the groove.

Inspect for wobbly sheaves with worn hub bearings. Replacement or remachining worn parts is essential if good rope life is to be expected.

For further information on the above, write for "Rope Dope," our educational bulletin which is published at frequent intervals.



UNION WIRE ROPE CORPORATION
GENERAL OFFICES AND FACTORY:
2100 Manchester Ave. Kansas City, Missouri

Tulsa • Houston • Chicago • Salt Lake City
New Orleans • Monahans • Portland • Ashland, Ky.

UNION
Wire Ropes

The "ULTIMATE LOW COST WIRE ROPE"



JUST GO

LIMA crane owned
by United Concrete
Pipe Corp., Los Angeles.
The crane is equipped
with a 140 ft. boom and
20 ft. hammerhead. The
bucket, and contents weigh
approximately 5000 pounds



5000 lbs.
ON THE END
OF A 140' BOOM
AND 20' JIB

Wherever crawler cranes are used, the name LIMA stands for "tops" in efficiency and performance. LIMA cranes have the facilities for doing work that ordinarily could not be done with a crawler crane. Their unusual stability, made possible by the use of cast steel truck and machinery base, low center of gravity, proper distribution of weight by placing machinery to rear of center pin, and long wide crawlers, enable them to complete difficult jobs with utmost precision and extra profits for their owners.

LIMA LOCOMOTIVE WORKS, Inc.
SHOVEL and CRANE DIVISION, - - - LIMA, OHIO

NEWARK, N.J. NEW YORK, N.Y. DALLAS, TEXAS PORTLAND, ORE. PHILADELPHIA, PA.
SEATTLE, WASH. SPOKANE, WASH. SAN FRANCISCO, CALIF. LOS ANGELES, CALIF.
MEMPHIS, TENN. MONTREAL, Quebec, Can. VANCOUVER, B.C.

**SHOVELS
DRAGLINES
CRANES**

LIMA

Why Gamble with fire on Important Contracts...

*... where human frailty, carelessness
or sabotage can destroy major
investments in money and effort*

Fire Damages Navy Tender At Mathis Yard

Fire at 12:15 P. M. today damaged the engines and generator of the submarine net tender, USS Teak, nearing completion at the Camden yard of the John H. Mathis Shipbuilding Company.

The \$500,000 vessel was launched 30 days ago and workmen had stopped work for lunch when the blaze was discovered in a tarpaulin covering the engine room.

Firemen donned masks to smother the flames after dense smoke drove them back several times. Officials of the firm, which is building three similar ships for the navy, said they didn't know the extent of the damage.

It was suggested that the blaze might have been started by a carelessly discarded cigarette. A sister ship of the 151-foot vessel, the USS Pepperwood, was launched last Friday.

Fire Chief Lennox said the damage was confined to the engines and generator.

For a few cents more per yard, this cover could have been made of FIRE CHIEF treated canvas—with the permanent fire-resisting finish that WON'T WASH OUT—and many hundreds of dollars and weeks of production would have been saved.

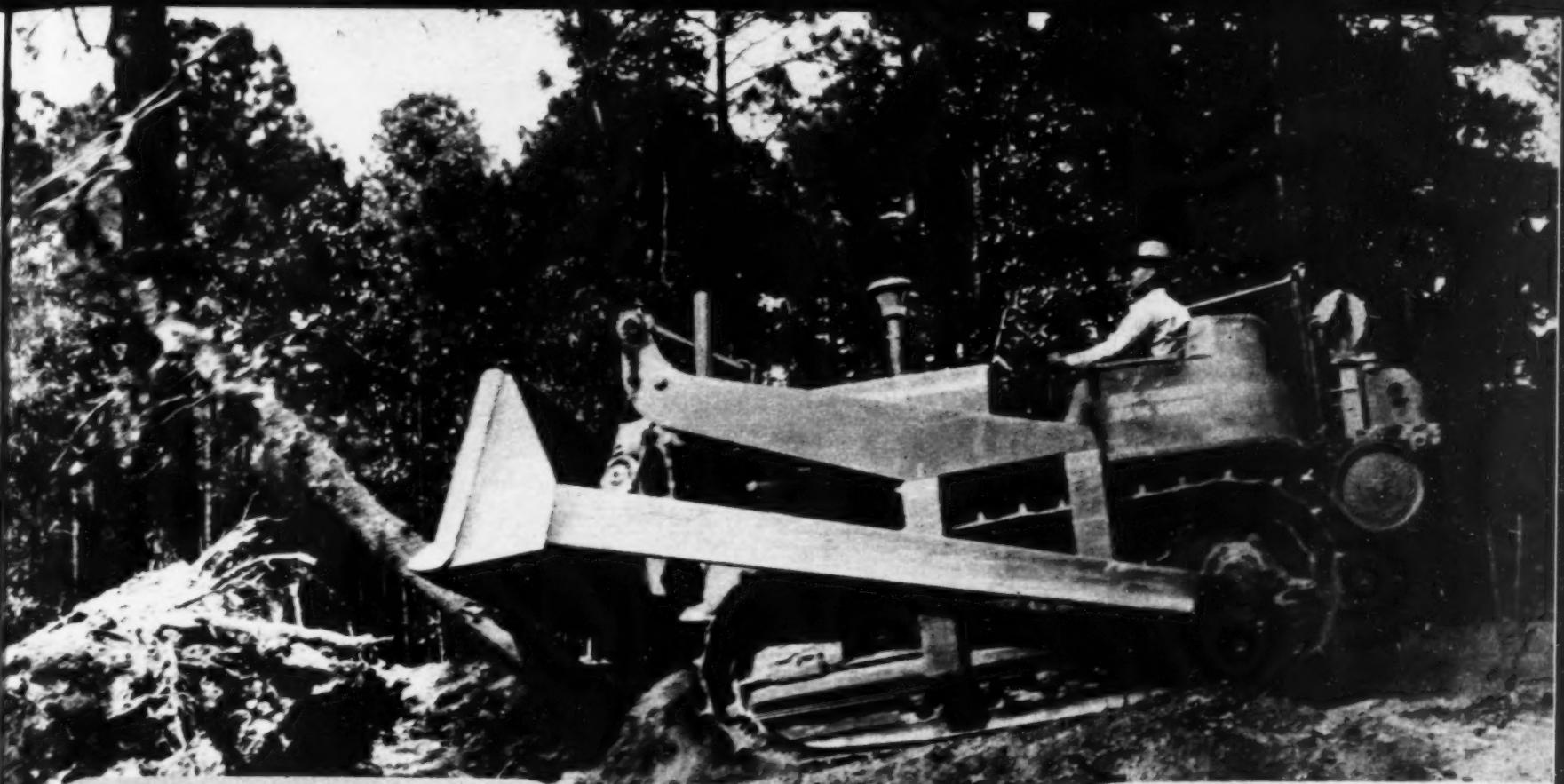
Indoors or out—wherever flammable canvas presents a fire hazard, from hot rivets, welding torches, carelessly thrown cigarettes and matches, or other causes, accidental or intentional, FIRE CHIEF treated canvas will not support combustion.

Approved by the Underwriters Laboratories and the Associated Mutual Fire Insurance Companies. Meets all Government requirements.

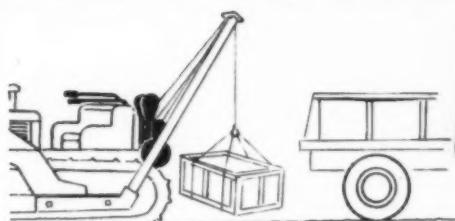
WM. E. HOOPER & SONS CO.
New York PHILADELPHIA Chicago
Mills: WOODBERRY, BALTIMORE, MD.

FIRE CHIEF

***The Finish That
WON'T WASH OUT***

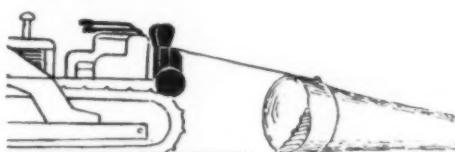


BUCKEYE Power Control Units



For lightning fast action and all the power you can use, you want Cable Control . . . at its best with Buckeye Hoists. Buckeye Hoists take hold of the load smoothly and evenly with no jerk on the line . . . you can use lighter, less expensive cable. They're fingertip controlled and *fast* and they'll stop a full load in a fraction of an inch.

Double drum models with wide drums spool 350 ft. of cable per drum—plenty for any job a tractor hoist has to do.



They'll handle Bulldozer, Trailbuilder, Ripper or Scraper—snake in logs, hoist heavy machinery, uproot trees, free bogged down equipment, pull skids and a hundred other things.

Medium and Heavy Duty Models with adaptors for every tractor—easy to install. Write for literature.

A COMBINATION that gets things done!

BUCKEYE Bulldozers and Trailbuilders are built for digging in, 'way back in where the going is toughest. Stout sidearms push brute blades that'll 'doe' rock and trees without a whimper. They're true Western type rigs.

And Buckeye Hoists are heavily built for the hard pulls. They have large, cool-running brake and clutch drums . . . all parts are precision-machined and run in oil or grease . . . they don't have to be babied.

Put this combination on your tractors and you'll have the spunkiest, fightenest units going — they'll work fast and long and give you more work in less time at less cost.

Write to Buckeye for the name of your nearest dealer.

**Buckeye Traction Ditcher Co.
Findlay • Ohio**

BUCKEYE UNITILT 'Dozers

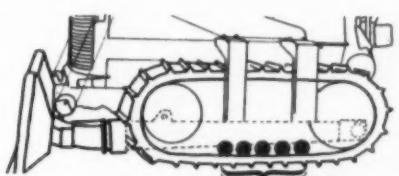


Bulldozer or Trailbuilder on a universal frame! Just change the blades—a quick, easy job accomplished by pulling two kingpins.

**Both
Blades
Tilt**

Bulldozer
as well as
Trailbuilder Tilts!

You can use the Bulldozer moldboard for many types of Trailbuilder work! Tilting device is adjusted by one nut!



Blades "Hug" Radiator

Buckeye blades hang close in to the tractor reducing heavy overhanging load and keeping the tractor in balance! The weight is distributed where it belongs—on all the track rollers! This saves wear and tear on front idlers and front track rollers!

Built by Buckeye

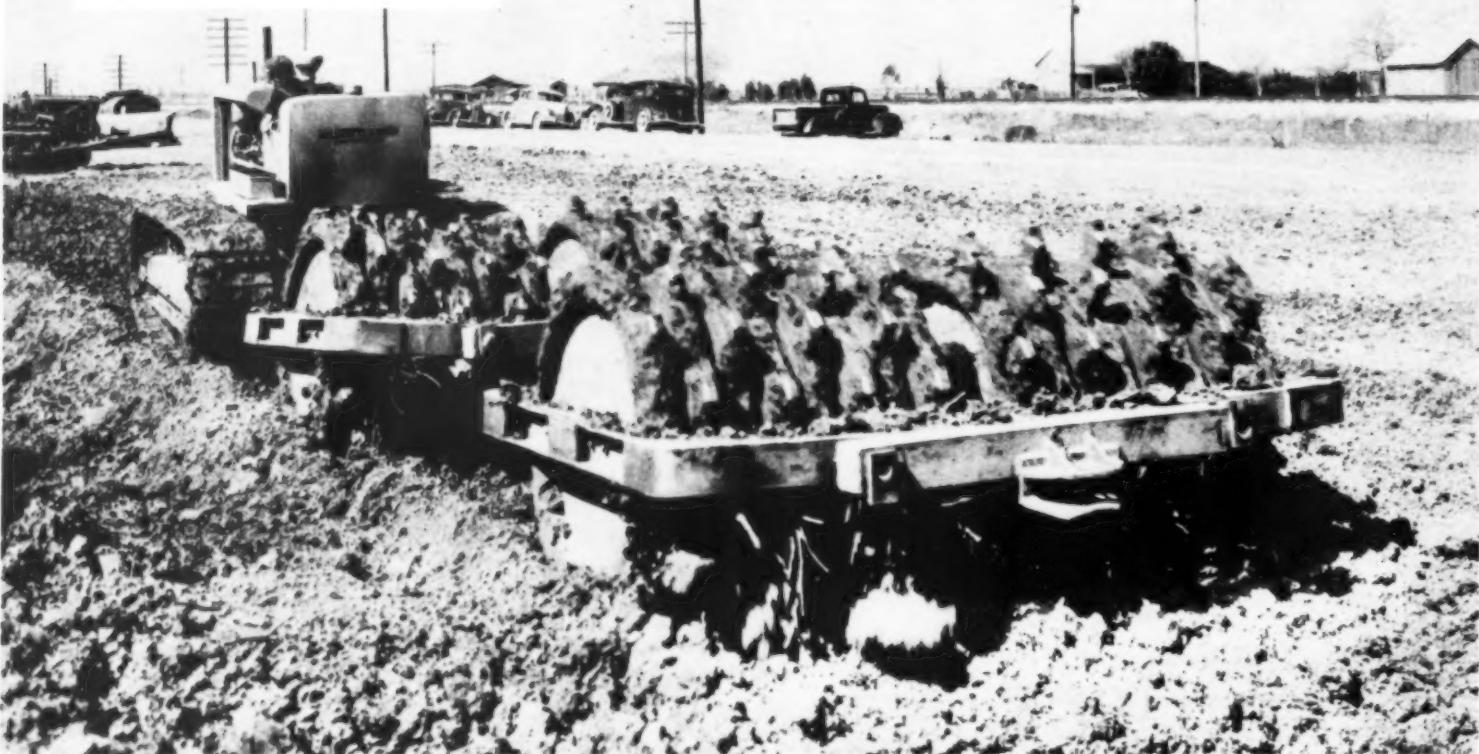
TRACTOR EQUIPMENT • SPREADERS
R-B FINEGRADERS • ROAD WIDENERS
CONVERTIBLE SHOVELS • TRENCHERS

DEFENSE EMERGENCY
loads are safe if lubrication
does not fail. For safe lubri-
cation of CONSTRUCTION
MACHINERY there are . . .

. . . **SINCLAIR SPECIAL-
IZED LUBRICANTS** de-
veloped to absorb the hard-
est punishment and keep
equipment regularly deliv-
ering top performance. For
lubrication advice or details
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gear oils and greases, write
nearest Sinclair office or
Sinclair Refining Company,
630 Fifth Avenue, New
York, N. Y.

*Write for "The Service Factor"—a free
publication devoted to the solution of
lubricating problems.*

EQUIPMENT of Heldenfels Bros.,
Rockport, Tex. working on Route 44.
Sinclair lubricants used by this Company.



SINCLAIR LUBRICANTS-FUELS

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2540 WEST CERMACK ROAD
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FAIR BUILDING
FT. WORTH

IT'S THE THOR-NADO FOR POWER!

SOME BLOW!

New And Faster, Here's The Hardest-Hitting Portable Electric Hammer That Ever Pounded Concrete—The "Thor-Nado", With Its Amazing "Sling Shot" Drive and Heavy Duty Motor

Since Thor introduced the THOR-NADO just 18 months ago, more than 3 thousand construction and maintenance men have decided they were fed up with weak-sister portable electric hammers. They saw the THOR-NADO in action . . . saw its smashing blow . . . its handling ease . . . its sturdy build — and

today they count their gains in the hours and dollars they save with their THOR-NADO.

So ask some of these THOR-NADO users what a THOR-NADO can do for you in hole drilling, demolition, channeling, cutting, chipping and scores of other jobs in stone, wood and metal.

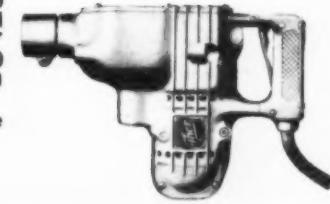
You'll hear about the speed with which the THOR-NADO puts a star drill through stone or knocks out a brick wall. That's because of Thor's special heavy duty motor that powers a blow more smashing than any hammer of comparable size and capacity.

You'll hear about the handling ease that comes from THOR-NADO'S light weight and perfect balance. Most of all, you'll hear about the way the THOR-NADO stands up on even the toughest jobs . . . and that's because of the exclusive "Sling-Shot" Drive that prevents shock to gears and motor.

Then try a THOR-NADO and see for yourself why it saves money, time and energy. Your Thor Distributor has them . . . look him up today.

Fast! Light! Powerful!

SIZE NO. U 100
 Capacity 1" Star Drill
 Weight ... 14 lbs. Length ... 13½"
 Blows per Minute 1600
 AC/DC Universal motor in 110, 220
 or special voltages.
 Furnished with steel carrying case
 and complete equipment.



Sling Shot Drive

The Thor-Nado's tremendous power and stamina is largely due to the ingenious new "Sling-Shot" Drive — a shock-proof rubber connection that whips the piston back and forth 1600 times per minute, acting as both power accumulator and shock absorber. With no metal connection between them, the piston blow is not transmitted to gears or motor.

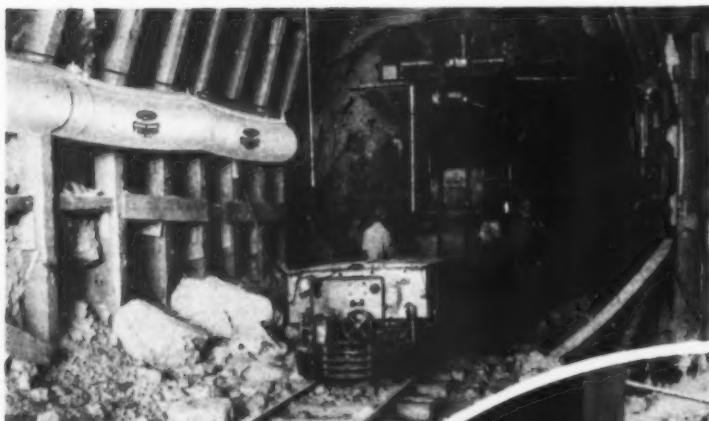
Thor Portable Power Tools

INDEPENDENT PNEUMATIC TOOL COMPANY



600 W. JACKSON BOULEVARD, CHICAGO, ILL.
 Branches in Principal Cities

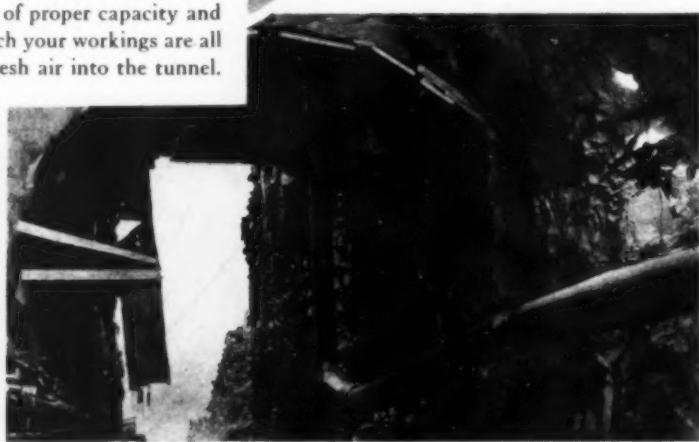
5 Reasons Why VENTUBE* is Used on so Many Big Jobs



1 RIGHT AT THE HEADING where you need it most—that's where "Ventube" rubberized ventilating duct gets! And to protect the tubing from flying rocks while blasting, the sections nearest the heading slide back quickly and easily. After blasting, "Ventube" slides forward again, bringing you clean, fresh air.

3 NO EXPENSIVE MACHINERY TO BUY. No massive equipment to move from job to job. A motor-driven fan of proper capacity and enough "Ventube" to reach your workings are all that's needed to blow fresh air into the tunnel.

2 IT'S EASY TO HANDLE. "Ventube" is light-weight. One man can install the entire system in a few hours. New type suspension hooks speed up work. Sections secure in air-tight joints in a few seconds. When the job is finished, it's easy to lift the hooks off the wire, roll up "Ventube" and carry it to the next job.



4 FLEXIBLE AS A HOSE. "Ventube" can go up and down steep inclines—turn sharp corners—go in and out of irregular passageways—and yet still keep a smooth interior for the unimpeded flow of fresh air. "Ventube" reduces air loss to a minimum. Sections are securely joined by air-tight detachable couplings to prevent leakage. You'll find "Ventube" is the cheapest, most effective way yet found to ventilate your tunnel.

5 MADE BY DU PONT. "Ventube" is made of carefully selected cotton cloth woven to high Du Pont standards. Even the thread that goes into the making of "Ventube" is chemically treated to resist fungus growth. Then the fabric is both coated and impregnated with rubber that makes it resistant to acid, gases, fungus and moisture! Ask Du Pont to give you an estimate for ventilating your next job.



E. I. DU PONT DE NEMOURS & COMPANY (INC.)
"FABRIKOID" DIVISION • FAIRFIELD, CONN.

"Ventube" is Du Pont's registered trademark for
its rubber impregnated flexible ventilating duct.

THE FLEXIBLE VENTILATING DUCT

* This roomy, compact powder bag is made of the same sturdy material as is "Ventube." The seams are sewed as tough as raw hide—and the fabric is coated and impregnated with thick, resistant rubber. Du Pont powder bags are available in several sizes. Write for complete information.

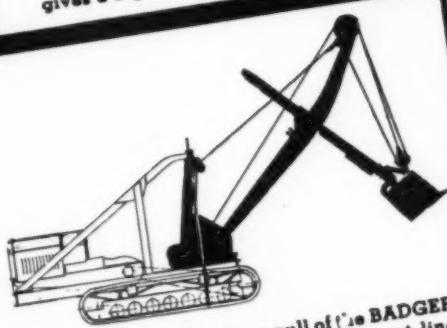


THERE'S NO FOOLIN' AROUND

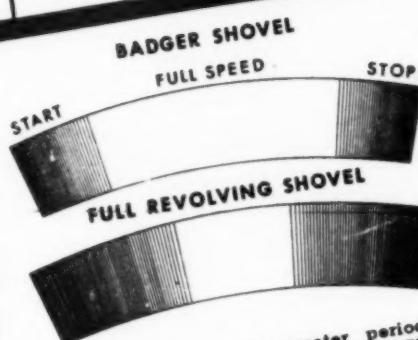


WITH A $\frac{3}{4}$ SWING BADGER ON THE JOB

The BADGER'S level full measure is exactly 12 cubic feet. From top of teeth to back of dipper it measures 13-1/2 cubic feet. Heap measure gives a capacity in excess of a full half yard.



The single line maximum pull of the BADGER is 10,000 pounds. Thus the three part line used results in a 30,000 pound pull... tremendous digging power.



Diagrams above show greater period of FULL SPEED provided by the BADGER'S faster start and stop. This extra period of full speed is possible because the BADGER has no excess load to be brought to full speed, stopped and reversed within the limits of a short swing.

- Every feature of conventional shovel design that is an obstacle to speed and output has been eliminated in building the A-W BADGER.

Size of dipper . . . digging speed . . . speed in swinging . . . low center of gravity that makes it possible to use 15 tons of upward pull for ripping through any material . . . ALL contribute to the BADGER'S amazing output.

An investigation will demonstrate conclusively that no full-swing shovel can approach the BADGER on these output-increasing points. Yet the BADGER 1/2-yard Shovel is priced lower than many 3/8-yard shovels. See it perform as a shovel, dragline, trench hoe, pile driver or skimmer before you buy. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

Austin-Western

MOTOR GRADERS

LOADERS

BLADE GRADERS

ELEVATING GRADERS

HYDRAULIC SCRAPERS

CRUSHING AND

SCREENING PLANTS

CABLE SCRAPERS

ROLLERS

ROLL-A-PLANES

MOTOR SWEEPERS

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SHOVELS AND CRANES

UNIVERSAL
LORAIN

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IT TRAVELS! 240 MILES

IN 10 HOURS BETWEEN JOBS
That's how fast this owner[†] moved
from one job to another with his Moto-
Crane* traveling—

1. Under own power.
2. On 10 rubber-tired wheels.
3. Over state highways.
4. Whether it's 5 miles or a 240 mile
move, the Moto-Crane* will travel
to the job in a hurry—and on
the job will give you the kind
of performance
listed below.



IT LIFTS!

850 TONS OF STEEL ERECTED AT AN AVERAGE RATE OF 40 TONS PER DAY

This owner's[†] output was made possible
by the Moto-Crane's*—

1. Maneuverability around the job.
2. Extensible booms (30 to 110 ft.)
3. Steel erector's precision boom hoist.
4. Balanced Center Drive turntable,
which develops maximum capacities
per pound of weight.



IT DIGS!

60 YDS. PER HOUR

OPERATING AS DRAGLINE
TO DIG 17 FT. SEWER TRENCH

This owner's[†] results are typical of what
you'll get with the Moto-Crane*, when
equipped with any of the following
interchangeable booms—

1. Dragline
2. Shovel
3. Clamshell
4. Backdigger



No job too small
or short... No job
too big or tough.

[†]Name on request.

Write for 24 page, illustrated catalog
describing the mechanized Moto-Crane*

UNIVERSAL CRANE DIVISION • THE THEW SHOVEL COMPANY
LORAIN, OHIO

* Reg. U. S. Pat. Off.





SPEED AND ECONOMY

Were Demanded

That's why Prefabricated Timber trusses were used!

Faced with a demand for rapid, low-cost construction of a carton factory for the California Container Corporation, the designers decided on timber trusses, prefabricated with TECO Connectors.

These trusses were prefabricated, assembled, and erected on a high-speed building schedule that even the most advanced engineering skill would find difficult to achieve with any other type of material.

Modern engineers and builders are finding that the TECO Connector System of prefabricated timber construction is enabling them to meet building budgets and emergency schedules with a precision never before thought possible.

TIMBER ENGINEERING COMPANY, Inc.

Dept. M-10 1337 Connecticut Ave. Washington, D. C.

Write for Literature

More traction than ever before

ON MUD AND SOFT GROUND



Here's what this new
GOODYEAR SURE-GRIP
GRADER TIRE gives you

66% more traction in hard snow on hard road
36% more traction in soft snow on hard road
33% more traction in shallow mud
12% more traction in six-inch-deep mud

ROAD graders are now being used for a wide variety of jobs—all of them requiring the utmost in tire traction. So traction, and more of it, is what you get in the new improved Goodyear Sure-Grip Grader Tire.

Its massive stud-bar tread, by actual test, delivers anywhere from 12% to as much as 66% more traction—depending on conditions. Reverse traction, too, has been stepped up markedly.

In addition, the Sure-Grip has numerous other advantages that make it the best bet for low-cost operation. Its open-center tread design insures posi-

tive self-cleaning. The tread and sidewalls contain up to 40% more rubber to guarantee longer wear.

The cord body is armored with a wider four-breaker unit that guards against shoulder cuts. The new high-tensile cord carcass is 10% to 12% stronger than ordinary cord. And not even the

most burdensome loads can chafe its improved non-rocking beads, or throw them out of alignment.

The Goodyear Sure-Grip Grader is available in popular sizes for graders and maintainers. Your Goodyear dealer will be glad to show you the one best suited to your type of equipment.

THE GREATEST NAME IN RUBBER
GOOD  **YEAR**

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

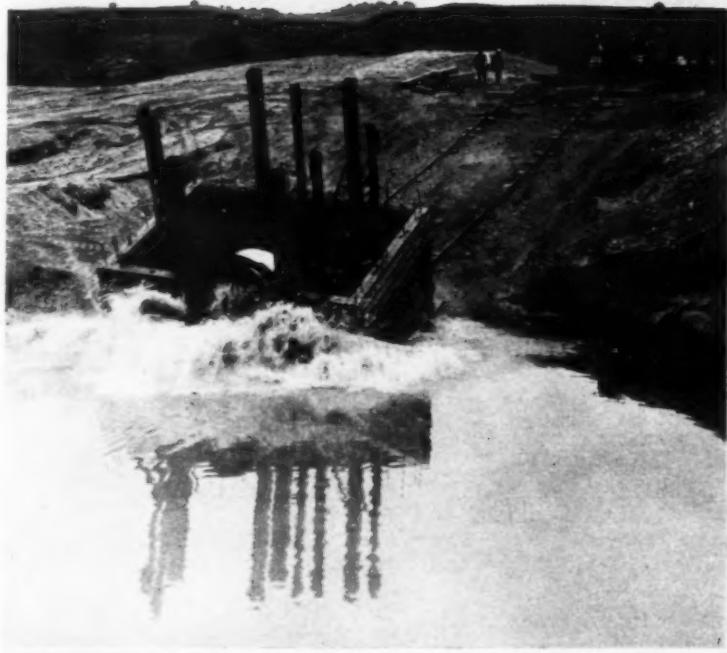
ROBERT K. TOMLIN, Editor

Volume 23

OCTOBER, 1941

Number 10

Belt Conveyor Loading Station . . . FRIANT DAM

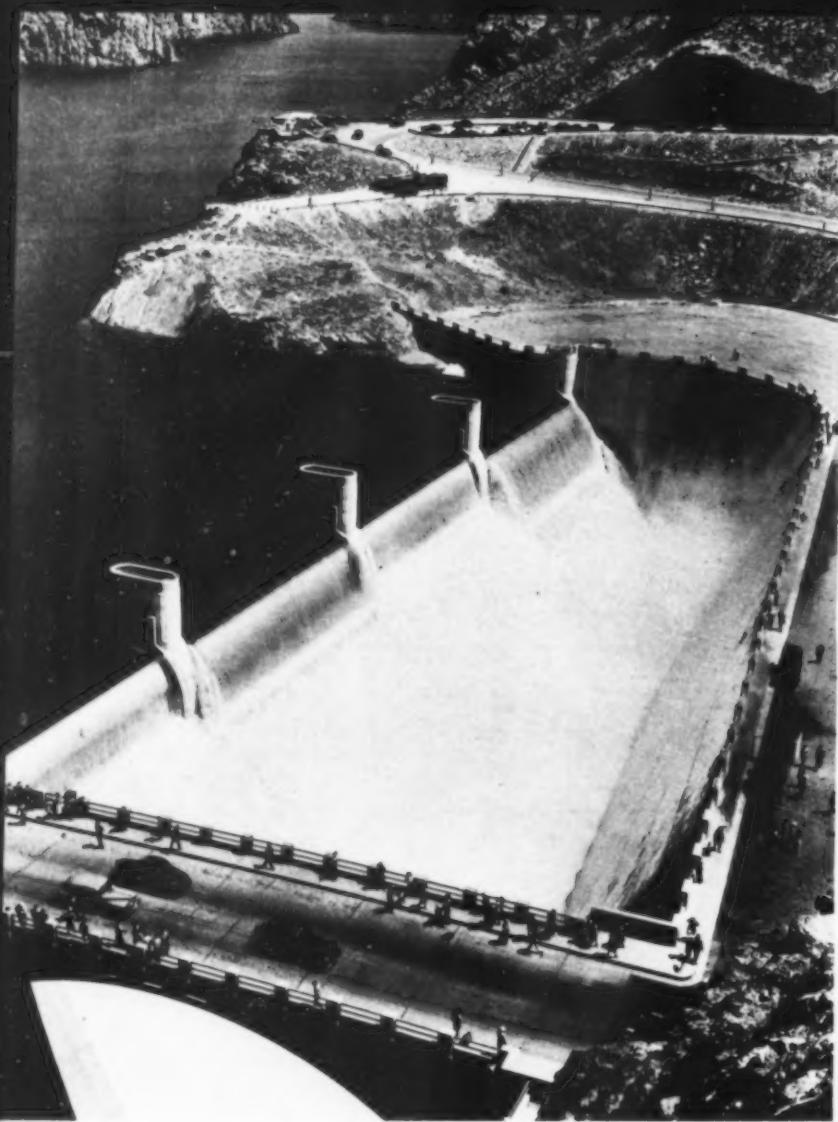


TWO BELT LOADING STATIONS in the gravel pit at Friant Dam, under construction for the U. S. Bureau of Reclamation by Griffith Co. and Bent Co., are below water level, although the grillage through which the material comes down to the belt hopper is well above the water table. When these loading stations were built, timber cribs were launched in the pools of water standing in the excavations, sunk and held in position with weights while the installation was completed. The portion of the cribs below water level is a concrete structure out of which the belt conveyor operates in a steel tube set on the desired slope. The steel tubes were made from the tanks of old, standard-gage tank cars.

The accompanying photographs show the operations of launching the timber crib and maneuvering the tube into position after it had been connected to the floating crib.



STEEL TUBE within which belt conveyor will operate is maneuvered into position at timber crib. **TIMBER CRIB** (inset) is launched in water-filled gravel pit at belt-loading station.



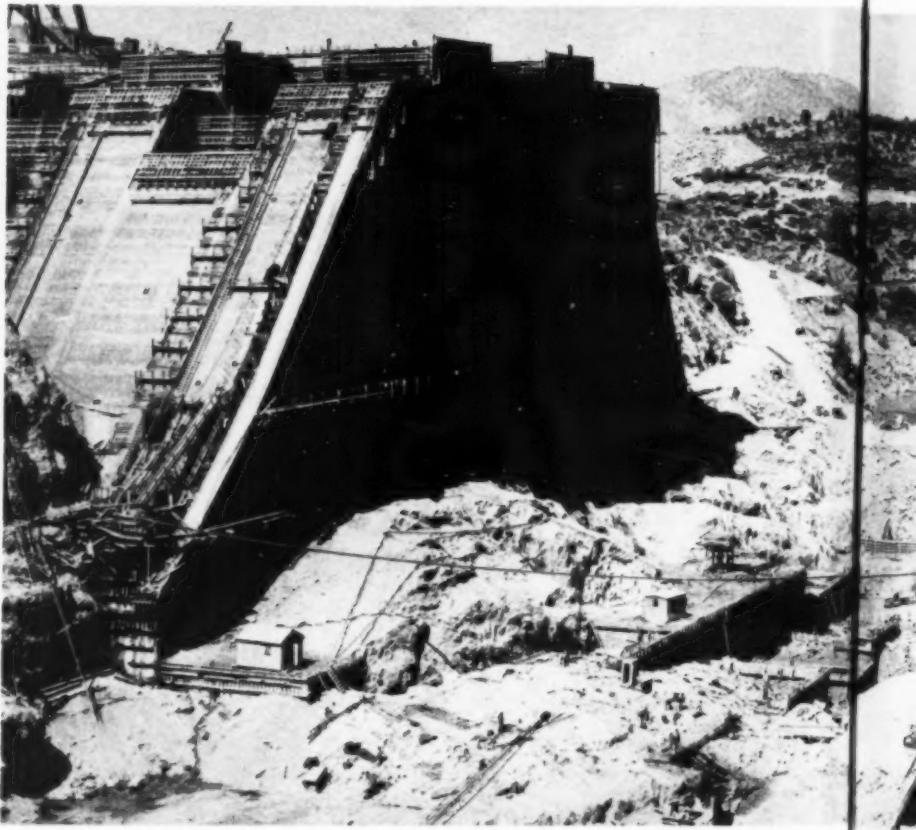
FIRST OVERFLOW OF SPILLWAY AT BOULDER DAM. U. S. Bureau of Reclamation structure 727 ft. high across Colorado River between Arizona and Nevada occurs August 6 when water which has been rising for 6½ years in Lake Mead, 115-mi. long reservoir created by dam, pours into concrete trough on Arizona side and passes through outlet tunnel around dam and back into river below.

MOVED BACK 60 FT. to make room for East River Drive, New York City's new express highway, 5-story steel-frame Willard Parker Hospital (**below**), weighing about 2,300 tons, is raised 13 in. by 52 hydraulic jacks and supported by steel rollers on steel beam tracks during journey to new foundation. Job was completed in 8 hr. by Spencer, White & Prentis, Inc., under direction of city's Department of Public Works.

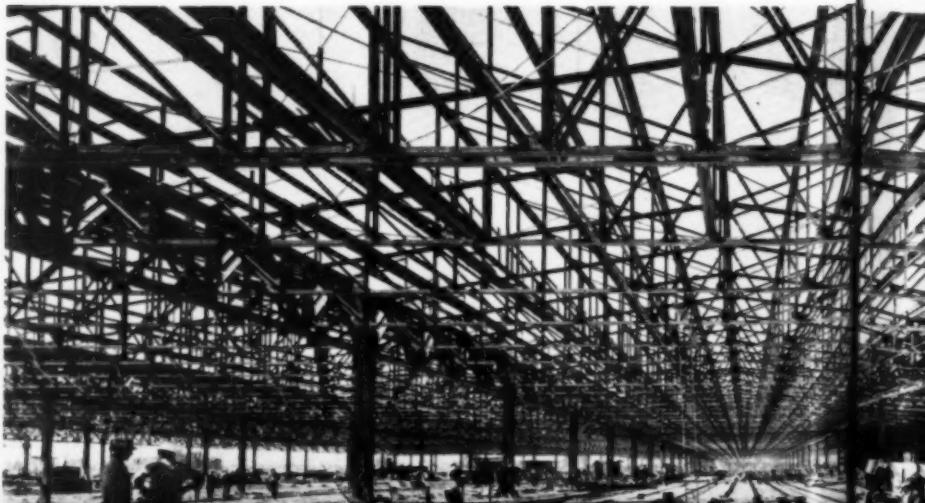
Wide World Photo



THIS MONTH'S NEWS REEL

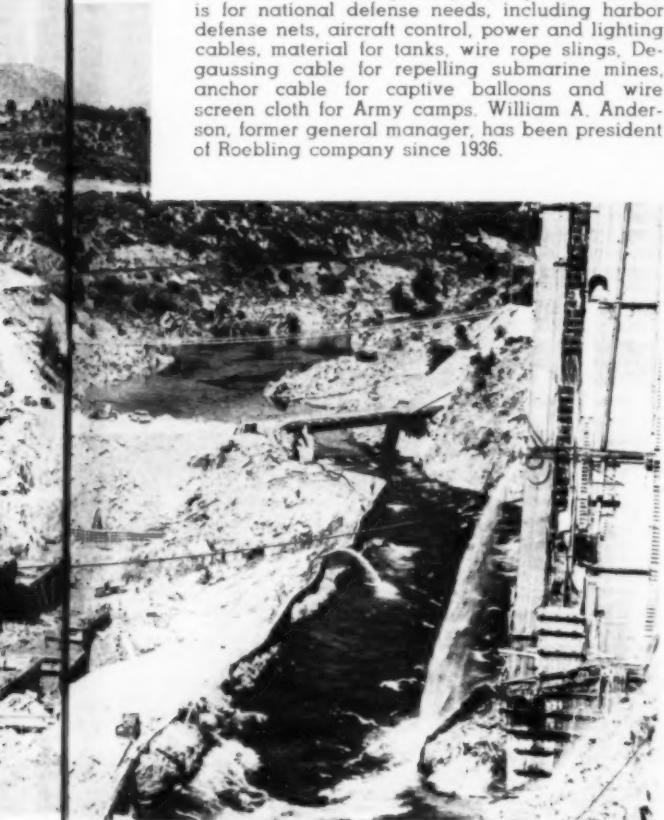


DIVERSION OF SACRAMENTO RIVER into temporary channel (at right) allows Pacific Constructors, Inc., to proceed with work in old stream bed at Shasta Dam, U. S. Bureau of Reclamation Central Valley project in California. Work is being rushed in order that concrete blocks of structure in hole may be poured before advent of winter floods.





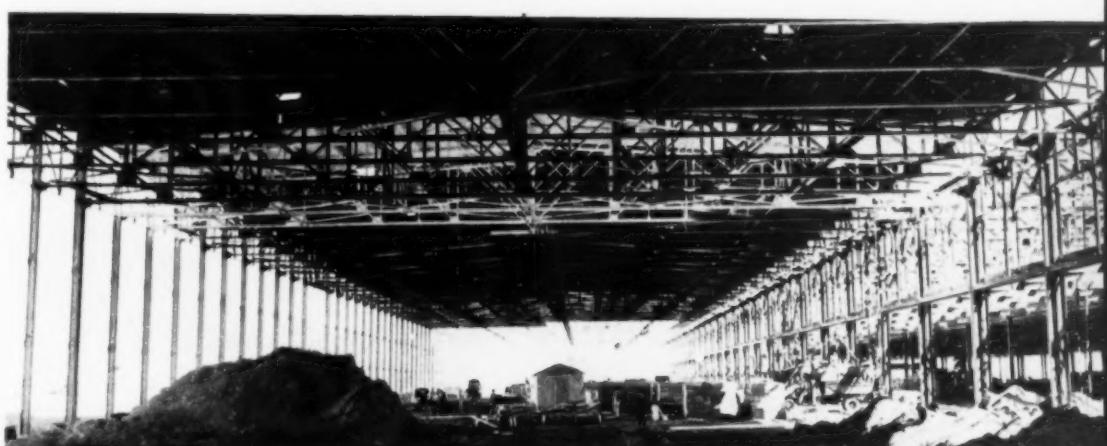
WIRE ROPE'S ONE-HUNDREDTH BIRTHDAY is celebrated Sept. 19 by John A. Roebling's Sons Co., Trenton, N. J., closely identified with construction industry, since its establishment in 1841, as makers of wire rope and suspension bridge cable. At banquet concluding ceremonies Leon Henderson (**above**) administrator, Office of Price Administration, Washington, D. C., was principal guest speaker. Among famous bridges with suspension spans of Roebling cable are Brooklyn Bridge, New York City, completed in 1883 with central span of 1,600 ft., George Washington Bridge across Hudson River, New York, with central span of 3,500 ft., and Golden Gate Bridge, San Francisco, with central span of 4,200 ft. Much of Roebling company's present output is for national defense needs, including harbor defense nets, aircraft control, power and lighting cables, material for tanks, wire rope slings, degaussing cable for repelling submarine mines, anchor cable for captive balloons and wire screen cloth for Army camps. William A. Anderson, former general manager, has been president of Roebling company since 1936.



BUICK'S HUGE AIRPLANE ENGINE PLANT (**below**), is here shown being rushed to completion by Thorgersen & Erickson Co., general contractors, on 125-acre tract in Melrose Park, Ill. Plant designed by Albert Kahn Associated Architects & Engineers, Inc., of Detroit, to cost \$31,000,000, includes, among number of other structures, 750x1,305-ft. one-story manufacturing building, with two-story sections on front and rear for offices, laboratories and test building. Monitor type steel frame is constructed with 60x75-ft. column spacing and 16-ft. vertical clearance. Design calls for cement tile roof and brick and glass walls.



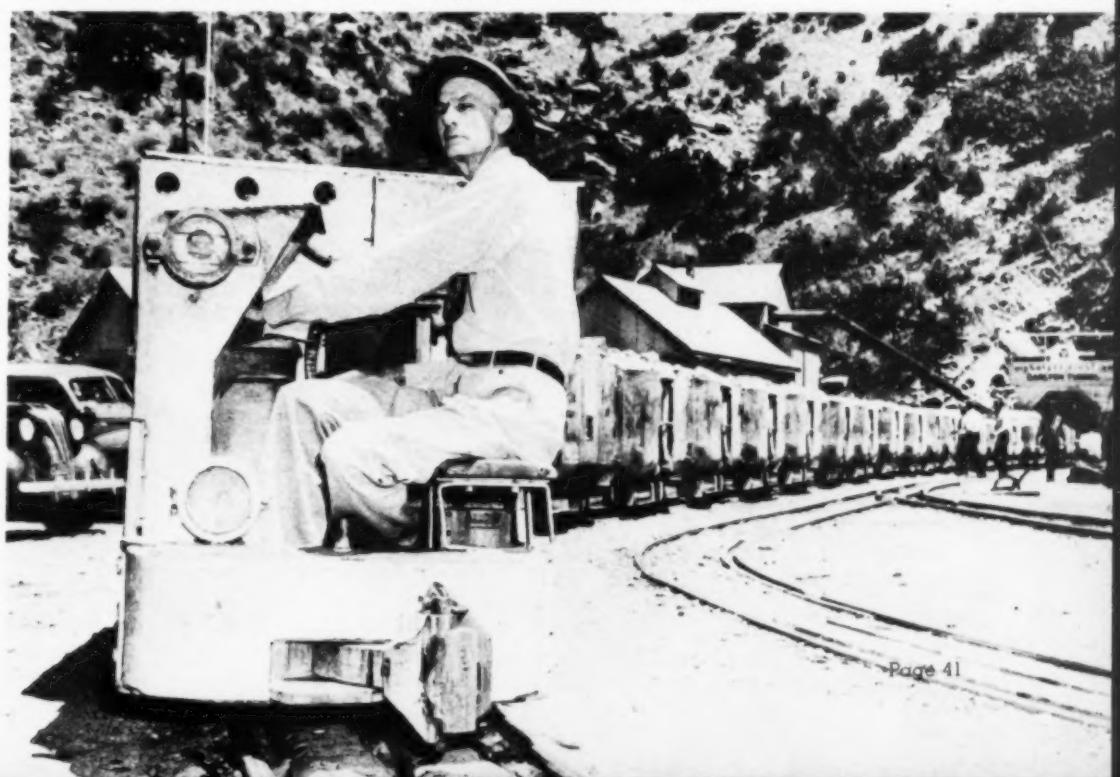
AIRCRAFT PARTS PLANT, to be leased and operated by Goodyear Aircraft Corp., takes form at Akron, Ohio, as Clemmer Construction Co., general contractor, speeds work on 1,000x100-ft. main building, requiring erection of 4,000 tons of steel and installation of 1,000,000 ft. b.m. of lumber.



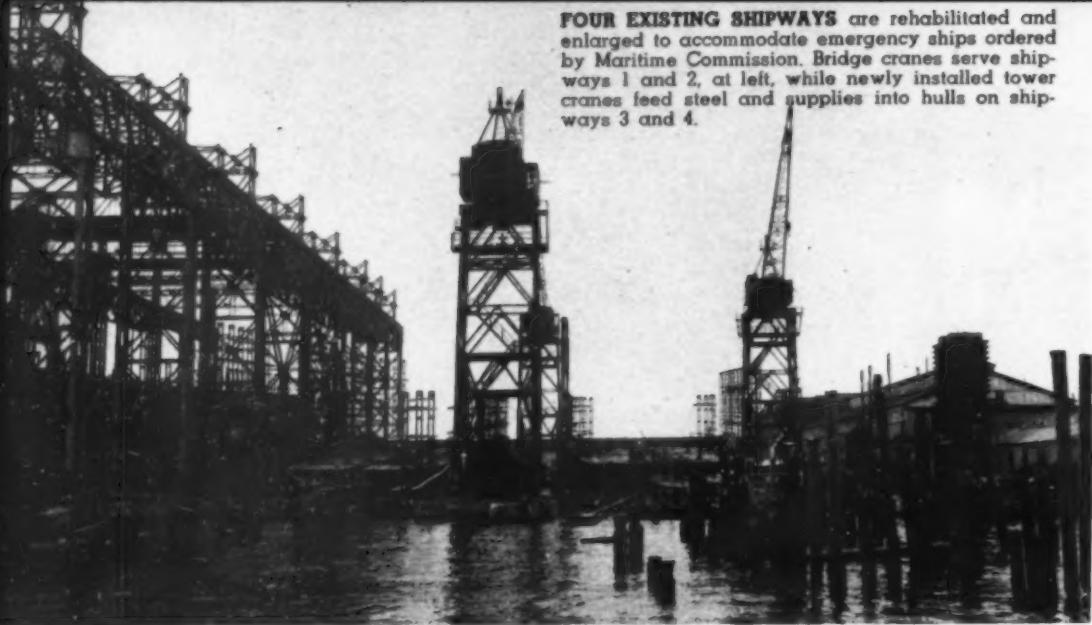
FORD BOMBER PLANT at Ypsilanti, Mich., \$48,000,000 defense project, is scene of high-speed construction on huge main factory building, 3,120 ft. long and 700 ft. wide, with an ell at one end extending to an overall length of 1,280 ft. and width of 540 ft. Albert Kahn Associated Architects and Engineers prepared plans for project and are supervising its construction. Bryant & Detwiler Co., of Detroit, is general contractor for masonry and architectural trades and coordinator of all trades under \$5,000,000 contract. Other contractors include John Miller Electric Co. (\$6,500,000); Whitehead & Kales, steel fabrication and erection, (\$3,000,000); J. A. Utley Co., foundations and tunnels (\$600,000); Donald Miller Co., plumbing and heating (\$3,000,000); Carlson Co., sheet metal ducts (\$1,360,000).

Wide World Photo

LAST TRAIN-LOAD OF MUCK (**below**), is hauled out of completed 6-mi. Carlton mine drainage tunnel at Cripple Creek, Colo., with JOHN R. AUSTIN, general superintendent in charge of job, at controls of General Electric storage-battery locomotive which hauls final and 5,798th 20-car train out of bore, which was driven at average rate of 51.09 ft. per day.



FOUR EXISTING SHIPWAYS are rehabilitated and enlarged to accommodate emergency ships ordered by Maritime Commission. Bridge cranes serve shipways 1 and 2, at left, while newly installed tower cranes feed steel and supplies into hulls on shipways 3 and 4.

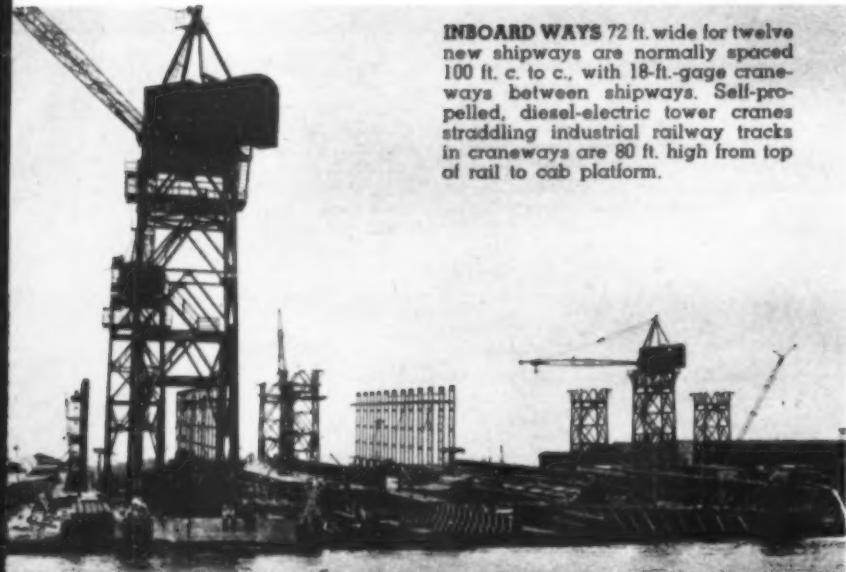


CONFRONTED WITH THE TASK of constructing twelve new shipways and rehabilitating four existing shipways in seven months for the Bethlehem-Fairfield Shipyard, Inc., on the south shore of the Patapsco River, Baltimore, Md., the Booth & Flinn Co., fixed-fee contractor, Pittsburgh, implemented the job with a mass of specialized equipment and a staff of skilled supervisory personnel to direct 2,500 workers on three shifts per day in driving piles, placing concrete and assembling timber structures at a speed which has made it possible to lay new ship keels on successive completed ways at a scheduled average rate of one every two weeks. Only 220 calendar days were provided between March 15, when the contract was be-

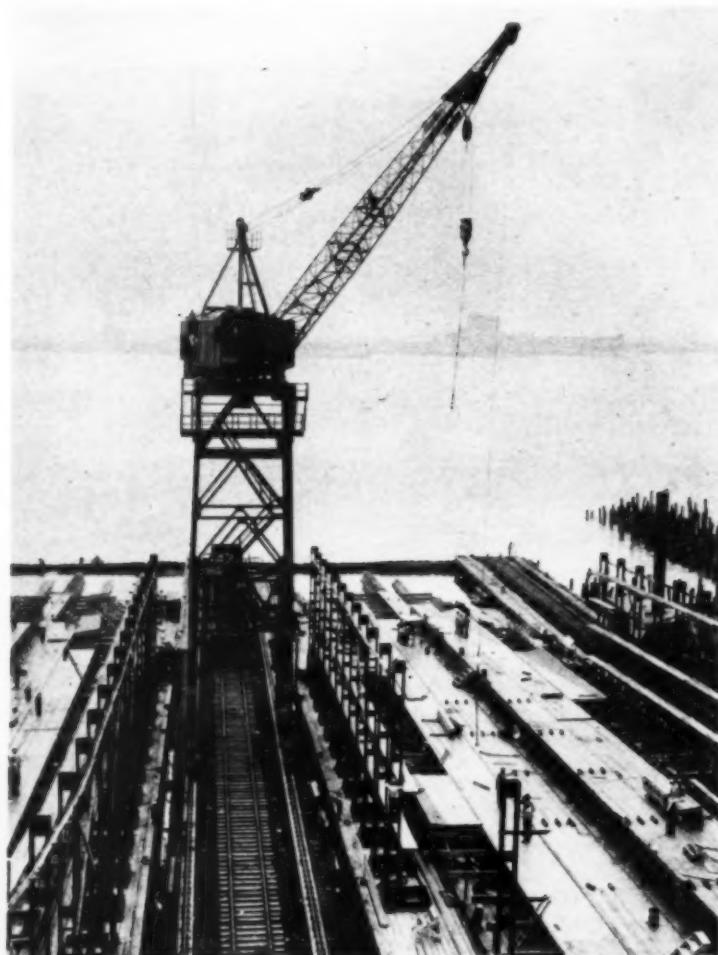
Sixteen Shipways

**Built at Average Rate of
One Every Two Weeks**

INBOARD WAYS 72 ft. wide for twelve new shipways are normally spaced 100 ft. c. to c., with 18-ft.-gage crane-ways between shipways. Self-propelled, diesel-electric tower cranes straddling industrial railway tracks in craneways are 80 ft. high from top of rail to cab platform.



SUCCESSIVE STEPS (below) in construction of inboard ways are indicated by operations from shipway 13, in background, where crane rig is driving piles, to shipway 7, in immediate foreground, where ship carpenters have laid keel blocks on keel timbers. Outboard ends of inboard ways are com-



TOWER CRANE traveling on 18-ft. gage track, 50 ft. off center lines of two adjacent shipways, is equipped with 90-ft. boom to handle steel into ships on both sides of craneway. Crane sets portable staging towers which supply shipbuilders' scaffolds.

pleted inside steel sheetpile bulkhead which keeps out tide. Whirley crane traveling on rails drives piles in vicinity of shoreline with adjustable welded leads which can be raised and lowered. In background is 7½-yd. clamshell dredge engaged in deepening river.



gun, and Oct. 20, when the keel blocks are due to go into position on the sixteenth way.

Rapid and well managed operations in driving 45,000 untreated timber piles 25 to 120 ft. long, in assembling 5,000,000 b. ft. of lumber in timber structures, and in handling 45,000 cu.yd. of concrete at rates of 450 to 650 cu.yd. a day, have enabled the contractor to keep the job in step with the progress schedule, drawn up to meet the most urgent request for speed by the U. S. Maritime Commission, which placed the order for construction of the yard and of 62 cargo ships with the Bethlehem-Fairfield firm, a subsidiary of the Bethlehem Steel Co.

A mop and a broom were the only



UNPREDICTABLE SUBSURFACE CONDITIONS cause irregularity in heights of driven piles, which are here being pulled into lines for pile bents and stay-lashed for cutoff.



ALL-WELDED LEADS hung on 60-ft. boom of 15-ton crane drive 65 to 70 piles per shift with 5,000-lb. single-acting steam hammer.



STEEL PLATE CAP spiked to butt provides all protection needed in driving pile for Baltimore shipways.





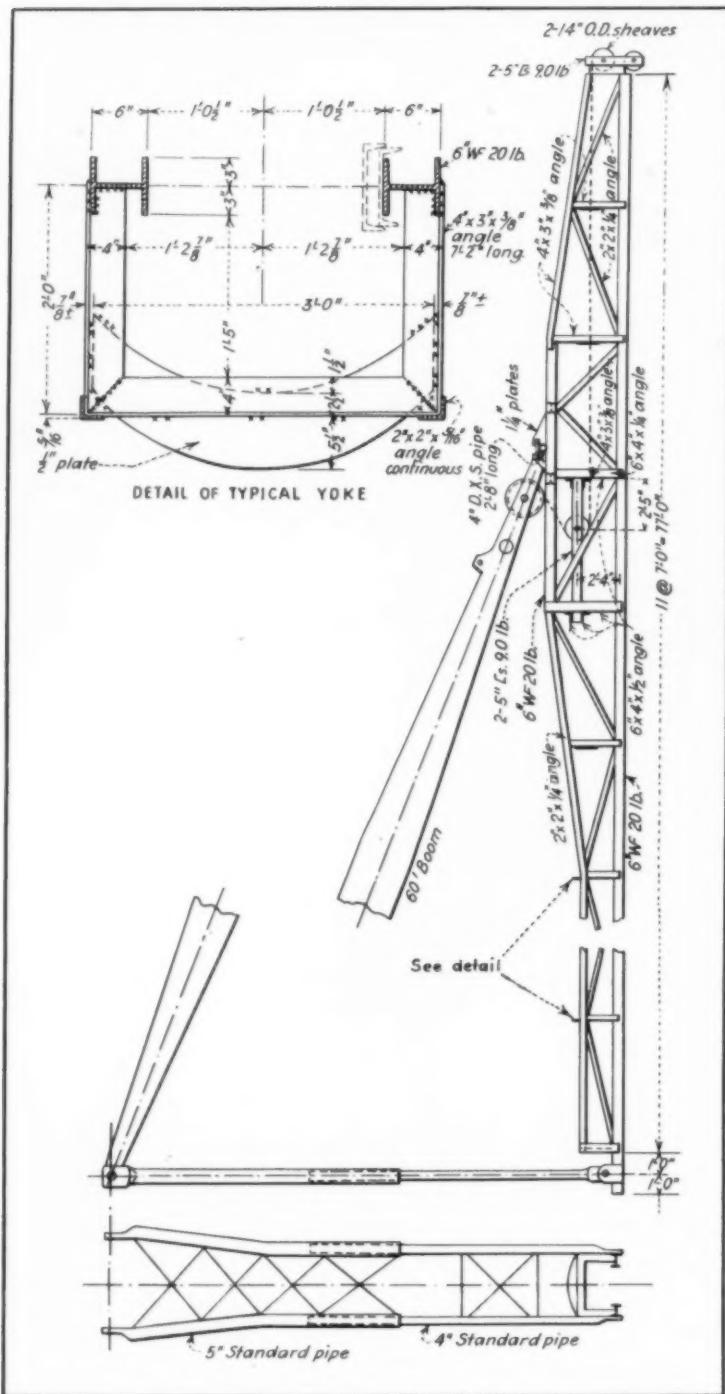
AFTER PILES have been stay-lashed to line and cut off to grade, cap timbers are placed and drift-pinned to piles with aid of pneumatic drills and hammers. Drift pins were $\frac{7}{8}$ in. in diameter and $2\frac{1}{2}$ ft. long.



KEEL TIMBERS in center of shipway are notched to provide level seats for keel blocks. To both sides of keel timbers are groundways, or launching ways, which are sanded to smooth surface for sliding.



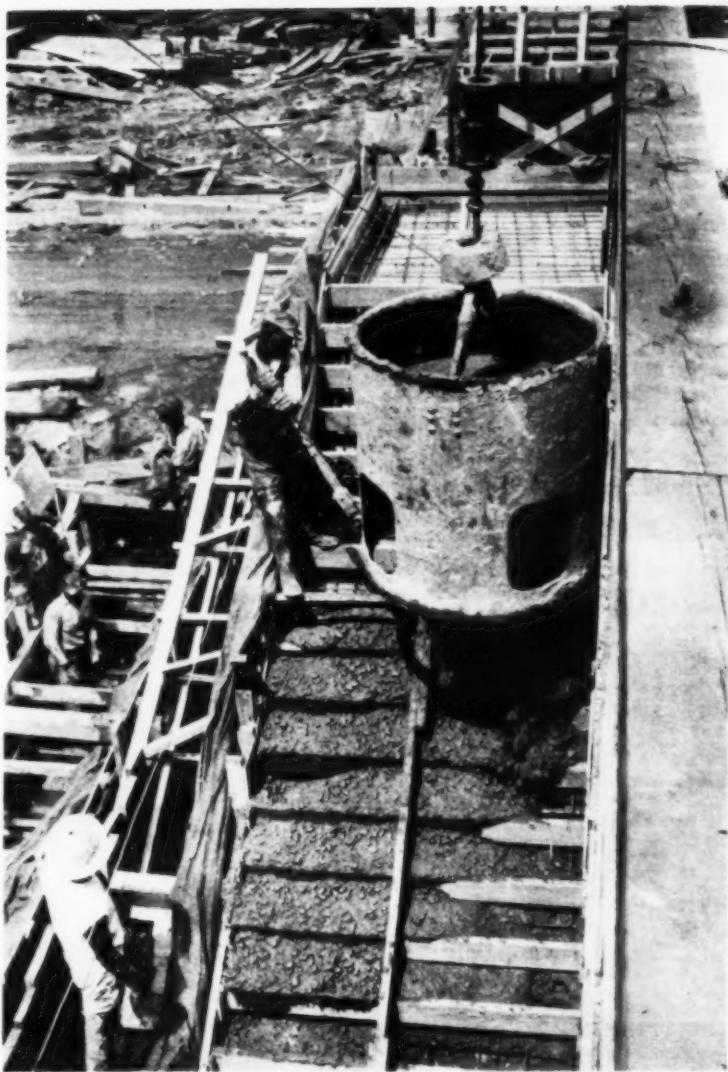
PILE BENTS (below) built to shipway grade support deck below reinforced-concrete headhouse. Fire walls are installed under timber deck. Practice of constructing craneways after completion of shipways, as exemplified by crane rail footings in foreground, quickly gives way to preferred plan of building craneways in advance.



NO WEIGHT IS WASTED in these 77-ft. all-welded hanging leads designed and built on job to drive piles up to 70 ft. long. Pinned keepers on hanger brackets prevent leads from getting off 4-in. double-strength pipe at boom tip.



TWO SETS OF FORMS (below) serve repeatedly for construction of reinforced-concrete headhouses in twelve new shipways. Heavy timber post-and-beams provide clear spans under concrete deck during construction.



CRANE-HANDED BUCKETS place most of 45,000 cu.yd. of concrete on job. Structural concrete is vibrated internally.

tools on the job when the signal to proceed was given on Saturday, March 15. Actual construction got under way the following Tuesday, when the first gang started work. No easy task faced the contractor's field forces. An area of 56 acres stretching for nearly half a mile along the bank of the broad tidal estuary had been leased from three firms: the Union Shipbuilding Co., the Gulf Oil Co. and the Weyerhaeuser Timber Co. The four existing shipways were in the area leased from the shipbuilding company. Marsh muck covered the entire site to considerable depth, and dry fill 18 in. to 4 ft. thick had to be placed as the first operation to bring the land up to grade and to provide a crust capable of supporting equipment.

During recent years the Union Shipbuilding Co. had engaged in a shipwrecking business, and pools of oil drained from dismantled boats had collected in many places on the marsh, creating an unfavorable and unpleasant condition



TRUCK MIXERS deliver all concrete to project, hauling 4-yd. batches about 1½ mi. from batching plant. Corrugated sheet metal used as roof form for utility tunnel and left in place speeds form erection and eliminates difficult operation of stripping.



PILE IN OIL-SOAKED GROUND of old shipyard are cut off with air-powered chain saw. Because of marshy soil, it is necessary to leave thin earth crust undisturbed until after equipment has driven piles, requiring later excavation in tight spaces between piles.

CONSTRUCTION OF CRANEWAYS (below) following shipways entails disadvantages which prompt change in working plans to call for completion of craneways (and included sections of utility tunnel) in advance of shipways. Crane handles concrete to footing from truck mixer on deck of shipway. Fleet of 15 truck-mixers delivers day's concrete requirements.



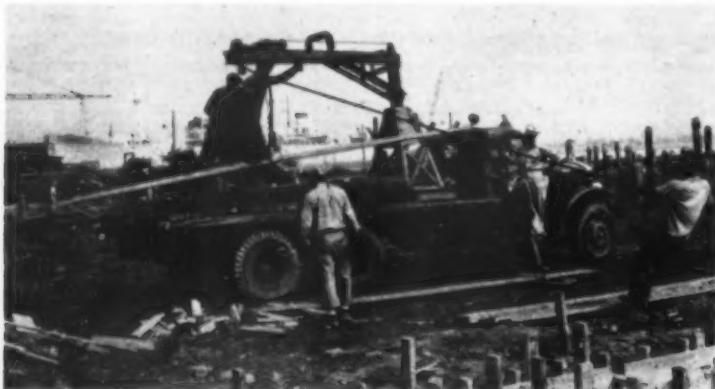


CONSTRUCTION OPERATIONS are kept under supervision for Bethlehem-Fairfield Shipyard, Inc., by R. W. GERMAN (right), assistant field engineer, and PAUL THOMPSON (left), chief inspector, while D. C. McLEOD (center), general carpenter foreman, directs timber work for Booth & Flinn Co.

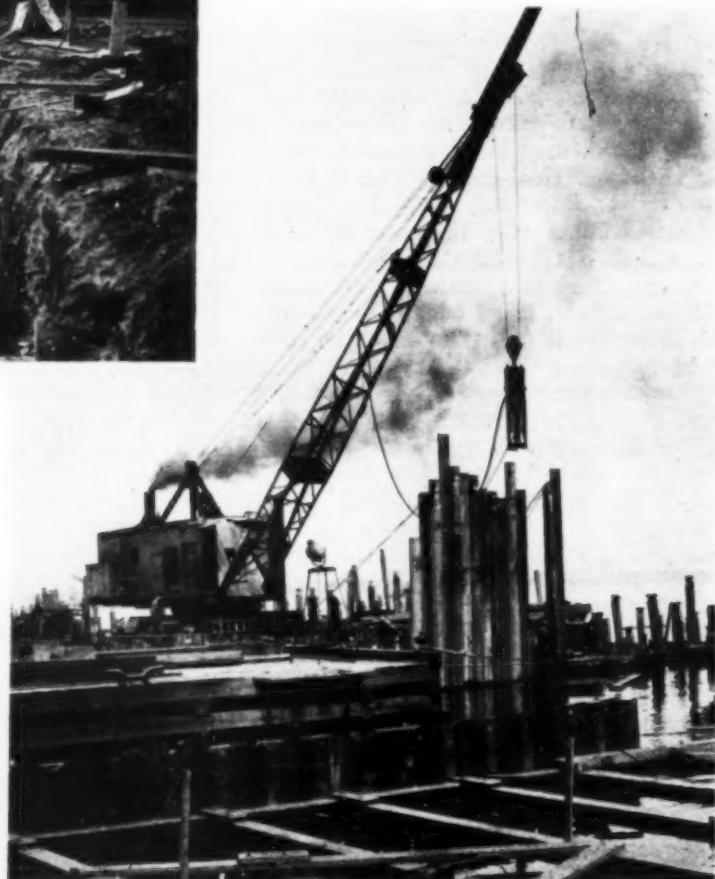
DIRECTING WORK for Booth & Flinn Co., contractor, are KARL C. WARNER (with hat), superintendent, and L. I. BARKAN, job engineer, inboard.



WELL AHEAD OF SHIPWAY CONSTRUCTION, concrete crew builds continuous footing for craneway rail. Ordinarily truck mixer traveling on thin crust of fill over marsh muck cannot approach so close to trench, and concrete must be placed by crane and bucket.



TROLLEY-BOOM SWING CRANE mounted on diesel truck, with hoist driver by power takeoff, is in great demand for distributing materials on site.



HANGING HAMMER fitted with guide frame drives cofferdam sheetpiles. Whirley crane on scow sets piles and operates hammer.

for later excavation and concreting. A marine railway of reinforced-concrete had to be blasted out to clear a space for one of the new shipways. Of two existing timber piers, one had to be removed and the second had to be reconstructed and extended. This pier, rebuilt and extended 400 ft. to an overall length of 900 ft., is one of two outfitting piers included in the present contract. To the west of the 900-ft. pier, a new pier 780 ft. long is being constructed. The longest piles, up to 120 ft. in length, are needed at the outer ends of the two piers.

In addition to the piers and shipways, the present contract calls for craneways between the shipways, a bulkhead 268 ft. long, 6 mi. of railway track serving the craneways and the assembly spaces behind the shipways, 1 mi. of 20-ft. roadway consisting of 4-in. bituminous top on 1 ft. of slag or gravel base, and seven new buildings of good size, one and two stories high. All the buildings are wood frame except one brick structure which serves as the compressor house and electric power substation. Existing buildings of the old shipyard have been reconditioned and improved under the contract, and two large reinforced-concrete septic tanks are being built.

Soil conditions at the site require that all structures of any weight be supported on piles. Core borings taken early in the year and analyzed by the consulting engineers, Moran, Proctor, Freeman & Mueser, of New York, disclosed extremely variable subsurface condi-

(Continued from page 104)

Outside Hiring Office CLEARS NAVY YARD OF JOB SEEKERS



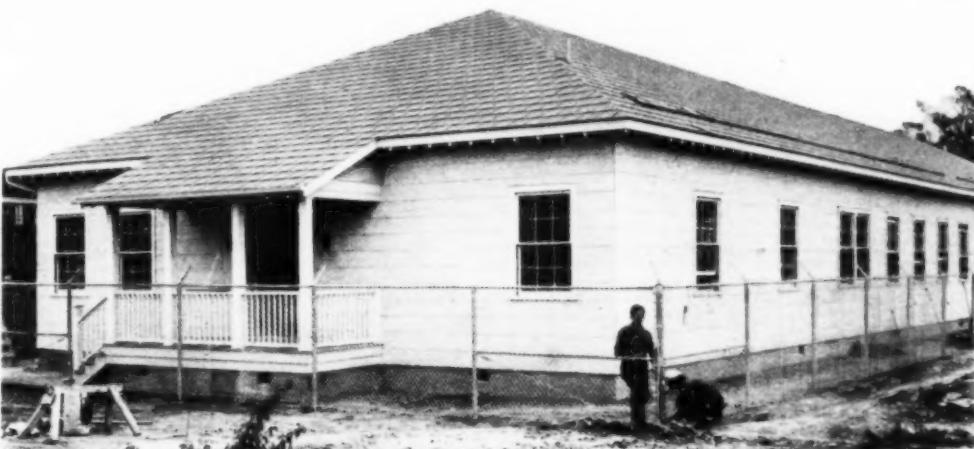
ON OUTSIDE OF BRICK WALL bounding Navy Yard, contractor for Bureau of Yards and Docks erects new wood-frame building to house employment offices which will serve to keep civilian applicants off Naval reservation until they have been hired. Asbestos-cement shingles are laid over building paper or roofing felt on wood sheathing.

U. S. Navy photo

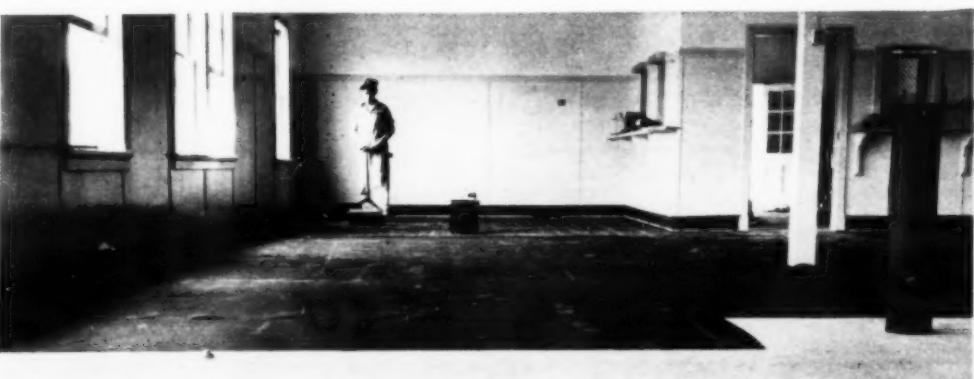


WOOD SHEATHING is applied diagonally to studs of wall framing. Foundation walls have ventilator openings to provide air circulation under floor joists.

U. S. Navy photo



WOVEN WIRE FENCING on steel pipe posts and rails surrounds employment building on three sides and connects with Navy Yard brick wall on fourth side.



BUILDING PAPER with mastic-sealed joints is rolled flat on subfloor prior to laying of t. & g. Southern yellow pine finish floor. Dry construction utilizes plywood and gypsum board for interior walls and ceiling.



TO KEEP CIVILIAN JOB SEEKERS outside the reservation while being interviewed and examined for employment at the Norfolk Navy Yard, Portsmouth, Va., the W. T. Gregory Co., contractor, Norfolk, Va., recently completed for the Bureau of Yards and Docks a \$24,400 Navy Department Labor Board building surrounded by a stoutly fenced area from which entrance is gained to the Navy Yard through a gate cut in an existing brick wall. The empoyment office and facilities are in a one-story wood-frame building, 45x165 ft., of dry construction, no plaster being used for interior walls or ceiling. Sidewall framing and interior columns rest on reinforced-concrete foundations.

Diagonal wood sheathing, building paper and Ruberoid asbestos-cement shingles form the inclosure of the exterior walls. On the roof, the cover consists of the same type of shingles laid over asphalt-impregnated felt on conventional wood sheathing. Interior walls are finished with plywood to 6-ft. height, with gypsum board above; the ceiling also is gypsum board. Flooring is straight-grain t.&g. Southern yellow pine on $\frac{3}{4}$ -in. sub-floor, with building paper between. The Navy Yard power plant supplies steam for heating. Small rooms are heated by radiators, and the main office and waiting room by unit heaters. Cyclone woven wire fence 7 ft. high, with barbed wire at the top, incloses three sides of the building and connects with the brick wall on the fourth side.

Comdr. A. K. Fogg (CEC) U.S.N. is public works officer in charge of construction at the Norfolk Navy Yard. For the W. T. Gregory Co., W. A. Dupree was superintendent on the Labor Board (employment office) building.



LAST STEEL TRUSS to support roof of 885x224-ft. windowless plant building for manufacture of Westinghouse fluorescent lamps is placed by erection crew at Fairmont, W. Va.



BRICK MASONRY PIERS to support ends of roof trusses are erected in advance of completion of bearing walls along sides of structure, as steel deliveries were made ahead of schedule.

In 76 Hours
**Steel Erectors Place
111 Cantilever Trusses
For 4½-Acre
Westinghouse
Blackout Plant**



TRUSSES OF CANTILEVER DESIGN are fabricated and erected in three sections. Side trusses 75 ft. 2 in. long have 14 ft. 6-in. cantilever overhangs beyond lines of interior H-columns. Central truss 71 ft. 8 in. long is suspended by pin connections between cantilevered ends of side trusses.

WITH STEEL ERECTION COMPLETED (below) in only 76½ working hours, work proceeds on pouring gypsum roof deck and building windowless brick and tile side walls.





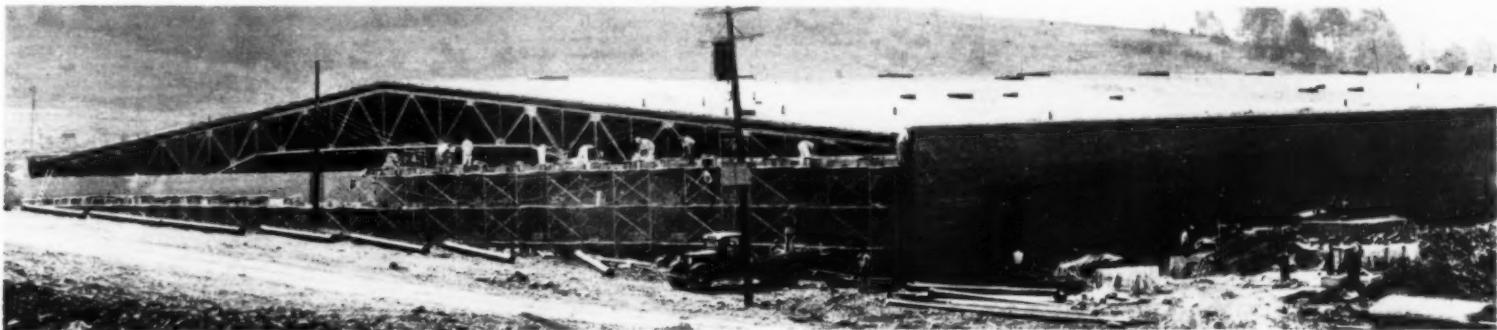
MAIN MANUFACTURING AREA is lighted by continuous strips of fluorescent lamps hung from bottom chords of steel roof trusses.

CANTILEVER TRUSSES, fabricated and erected in three sections with central suspended spans pin-connected to side spans serving as anchor arms, constitute one of the structural features of the new \$3,000,000 windowless, air-conditioned "blackout" plant recently completed in 5 months by the newly organized construction department of the Westinghouse Electric & Manufacturing Co. at Fairmont, W. Va., to house the large-scale manufacture of fluorescent lamps. The main building, a one-story steel frame structure 885x224 ft. in plan, with brick and tile bearing walls, provides nearly 200,000 sq.ft. of

(Continued on page 100)

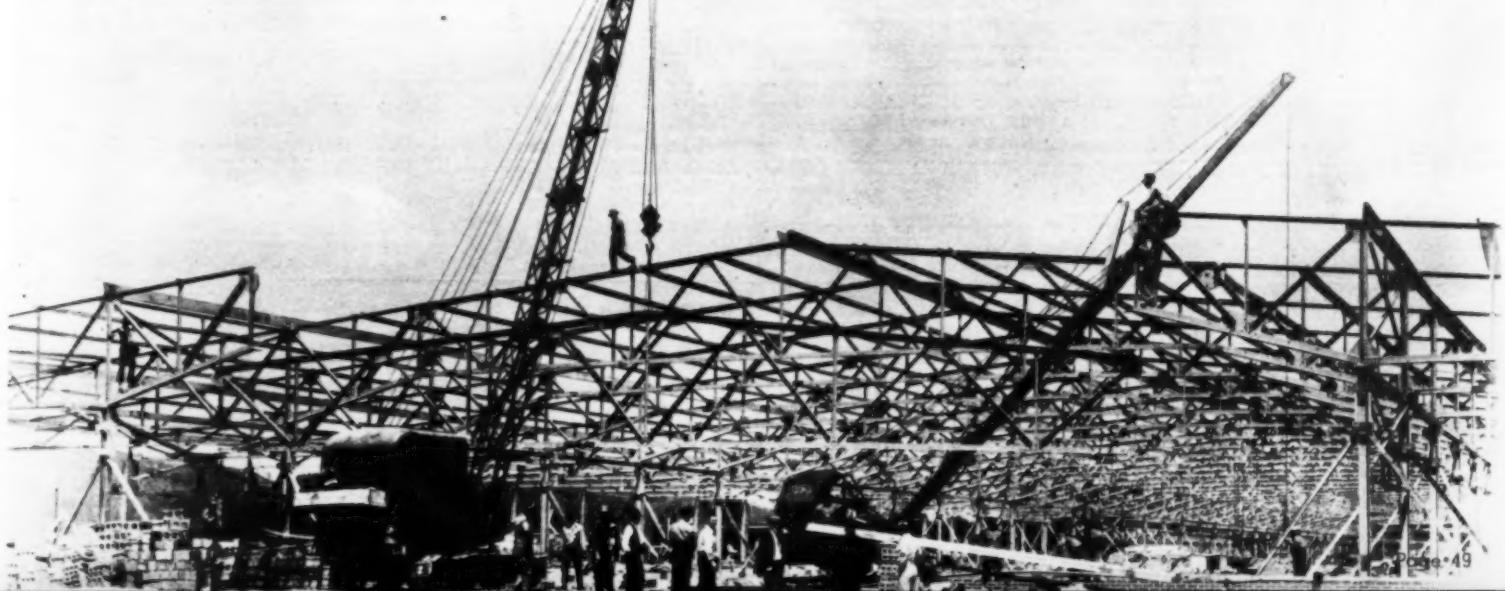


FLOORING in manufacturing areas is $\frac{3}{4}$ -in. thick emulsified asphalt mastic mix on 5-in. concrete base reinforced with steel wire mesh.



WINDOWLESS STRUCTURE 885 ft. long and 224 ft. wide nears completion as brick and tile side walls are finished and built-up tar and gravel roof is laid on poured gypsum deck supported by steel trusses of cantilever design.

CRAWLER CRANES raise center truss to place between cantilevered ends of side trusses where pin-connected field splices are made.

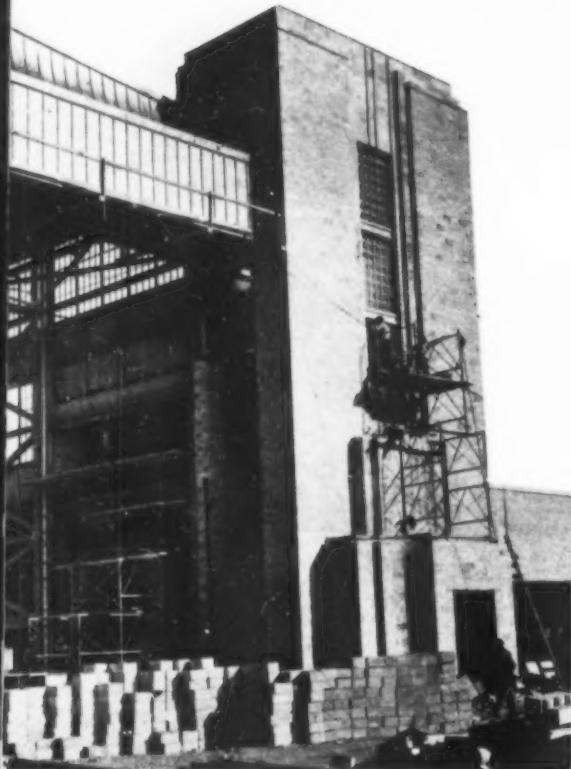


FIXED-FEE CONTRACTORS

COMPLETE

Jacksonville

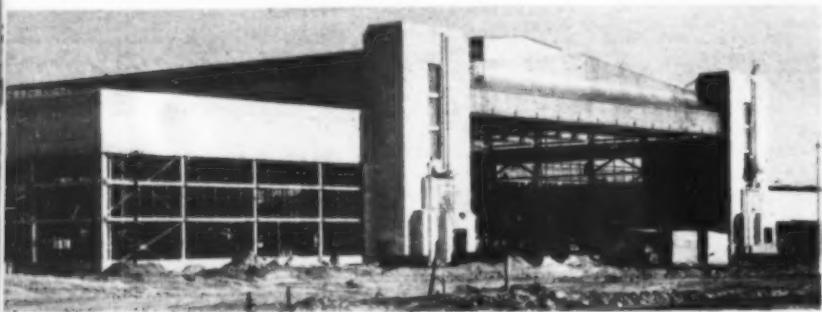
Naval Air Station



SECTIONAL STEEL SCAFFOLD serves Doyle & Russell workmen putting finishing touches on glass block panels in pilaster flanking hangar doorway of assembly and repair shop.



TWO-STORY UNIT in office wing of assembly and repair building houses air-conditioning equipment supplying filtered, conditioned air to instrument shop.



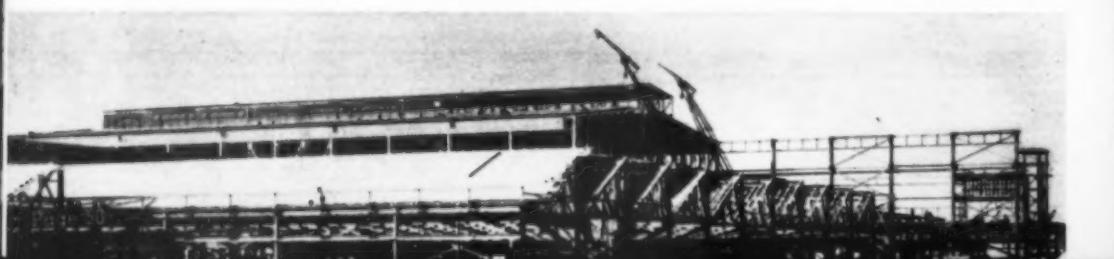
MASSIVE PILASTERS of concrete and glass block and exposed copper flashing over main door mark hangar section of assembly and repair shop covering total of 8 acres. Heavy steel frame, providing 40-ft. clearance under hangar trusses, is designed for 50-lb. wind load, standard for permanent structures at Jacksonville base. Entire structure rests on untreated wood pile driven in hydraulic sand fill and cut off below water table. Original unit of this building is constructed under lump-sum contract by Doyle & Russell, Richmond, Va.; extensions are added by group of three firms operating on fixed-fee basis.

LONG-BOOM CRAWLER CRANES (below) erect steel frame for extension of hangar in assembly and repair shop. In foreground, sawtooth roof of machine shop in same building is sheathed with wood decking. Sound-insulated test stands for aircraft engines are included in layout for this side of assembly and repair shop.



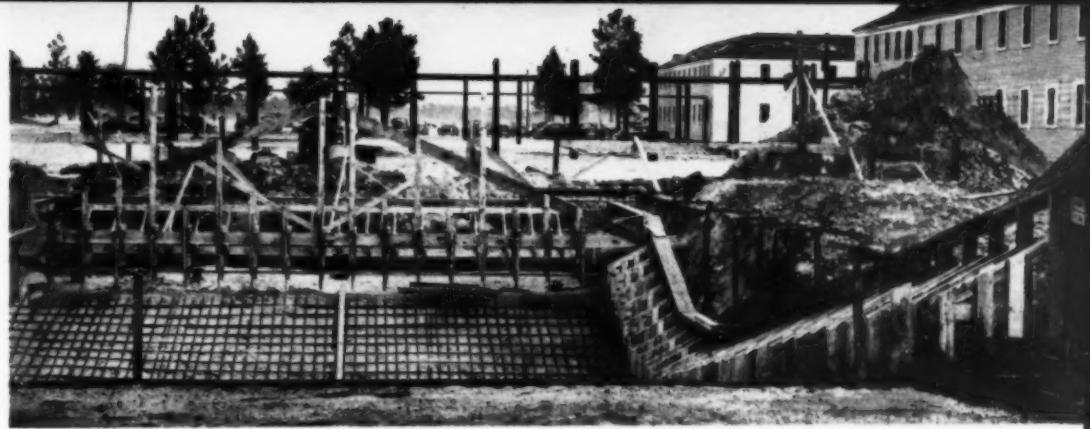
TWO BATCHING PLANTS handle sand and three gradations of coarse aggregate (pea gravel to 1-in. size) for truck mixers of Capitol Concrete Co., Jacksonville, supplying ready-mixed concrete to fixed-fee contractors. Maximum fleet of eight 2-yd. mixers and seven 1½-yd. mixers delivers up to 625 cu.yd. of concrete to scattered locations in 8-hr. day. Average day's requirements of 350 cu.yd. are supplied by smaller fleet.

WELDED HUMP (right) on truck-mixer drum actuates revolution counter mounted on each unit by Capitol Concrete Co. to assure conformity with specifications requiring 40 revolutions per batch. Concrete is mixed in transit to delivery point.



ENLARGEMENT OF PERMANENT FACILITIES already under construction at the Jacksonville, Fla. Naval Air Station and addition of facilities to take care of a greatly increased population were two important objectives of a cost-plus-fixed-fee contract awarded by the Bureau of Yards and Docks of the Navy Department on June 28, 1940, to a group of three firms: the Duval Engineering & Contracting Co., Jacksonville, The George D. Auchter Co., Jacksonville, and the Batson Cook Co., West Point, Ga. The estimated value of construction called for by the original contract amounted to \$12,336,000; later expansion of the project increased this amount to nearly \$25,500,000. Operating a single shift, 48 hr. per week, with a peak employment of 4,500 men, the contractors made rapid progress. The station was commissioned in October, 1940, nine months ahead of the originally scheduled date, and training of flying cadets and mechanics started in January of this year.

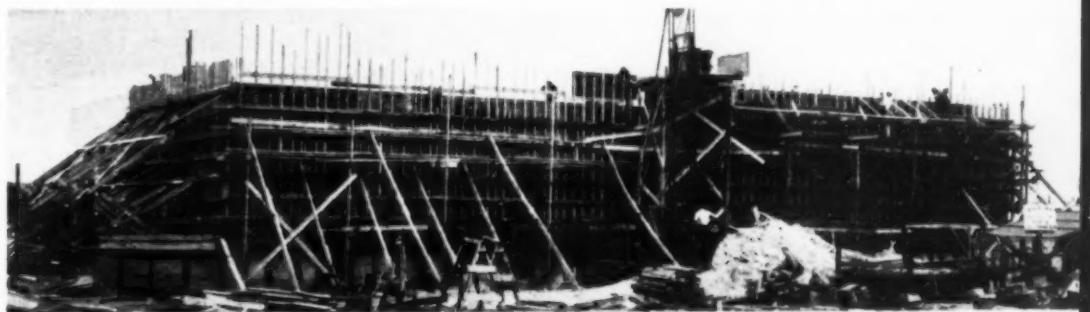
A 3,260-acre site for the U.S. Naval Air Station on the broad St. Johns River was presented to the Navy Department by Duval County in 1939, and the first lump-sum contract for construction of the air station was awarded in October of that year. During the next six months bids were taken and contracts awarded for dredging, clearing and grubbing, bulkhead, pier, ramps, hangars, storehouses, assembly and repair shop, officers' quarters, barracks, fuel storage and utilities: water, sewer, steam and electric systems. All of these contracts were for permanent operational facilities. By the fixed-fee contract signed in June, 1940, the permanent fa-



SWIMMING POOL in barracks area is excavated and concreted in dry sand soil predrained by Moretrench well-point system. Present plans provide four swimming pools for air station. All excavation on project is predrained by well points, as water table is only about 2 ft. below ground surface.



GENERAL STOREHOUSE of heavy reinforced-concrete design, completed as lump-sum job by Hillyer & Lovan, Jacksonville, is being extended by fixed-fee contractors with addition at far end of building.



HOIST TOWER of self-raising type, operating cantilever platform capable of lifting 1-ton load, elevates materials to scaffold bridge for construction by fixed-fee contractors of addition to reinforced-concrete paint and oil storehouse.



TEMPORARY 150-MAN BARRACKS designed for minimum life of 25 years are served by pole steam lines erected at substantial saving over cost of underground lines installed in permanent area. In common with other buildings resting on undisturbed, natural sand soil, barracks are supported by footings of 2,500-lb.-per-square-foot bearing, adopted as safe loading value after 4,000-lb. test had shown no settlement.

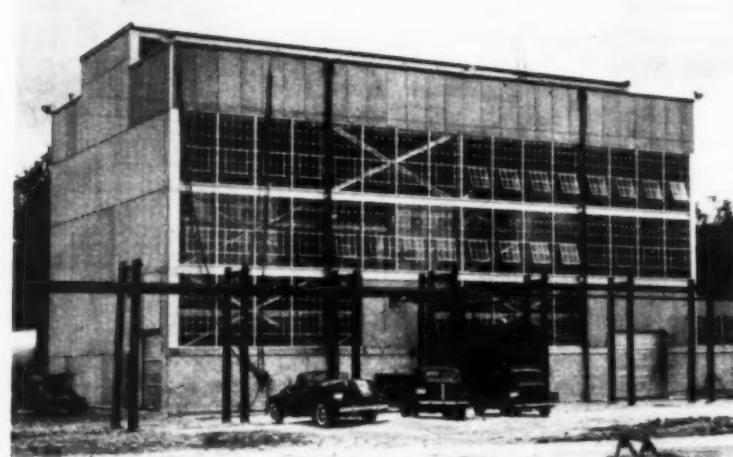
PERMANENT WOOD-FRAME BUILDING (below) for bachelor officers quarters, erected on fixed-fee contract by T. A. Loving & Co., includes colonnaded portico outside tall doors of dining hall. Exterior walls are inclosed with diagonal wood sheathing and building paper under wood siding. Roof is covered with interlocking clay tile laid over roll roofing. Structure rests on concrete foundations and has concrete pan floors.



TIMBER CONNECTOR employed in fabricating roof trusses for dining hall in bachelor officer quarters are indicative of general use on the project of various types of connectors in framing timber trusses for spans up to 60 ft.



SEPARATE BATCHING AND MIXING PLANT is set up with hoist tower by fixed-fee contractors to build reinforced-concrete addition to general storehouse, illustrated by photograph on preceding page. Concrete production for this building varies from ordinary practice on other structures, to which truck mixers deliver concrete batches.



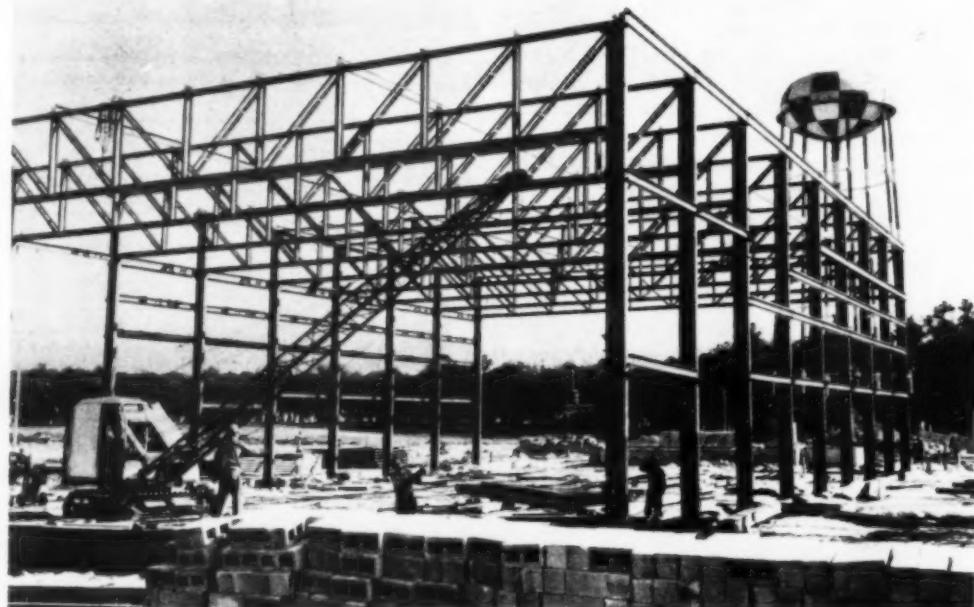
SECOND HEATING PLANT, built by fixed-fee contractors, is connected into common grid with original boiler house to supply steam for heat and hot water. Steel-frame building, housing three 45,000-lb.-per-hour steam boilers, is inclosed with corrugated asbestos-cement siding and roofing; same type of inclosure is used on all hangars at Jacksonville station.

cilities were extended, a flying field was constructed and temporary buildings were erected.

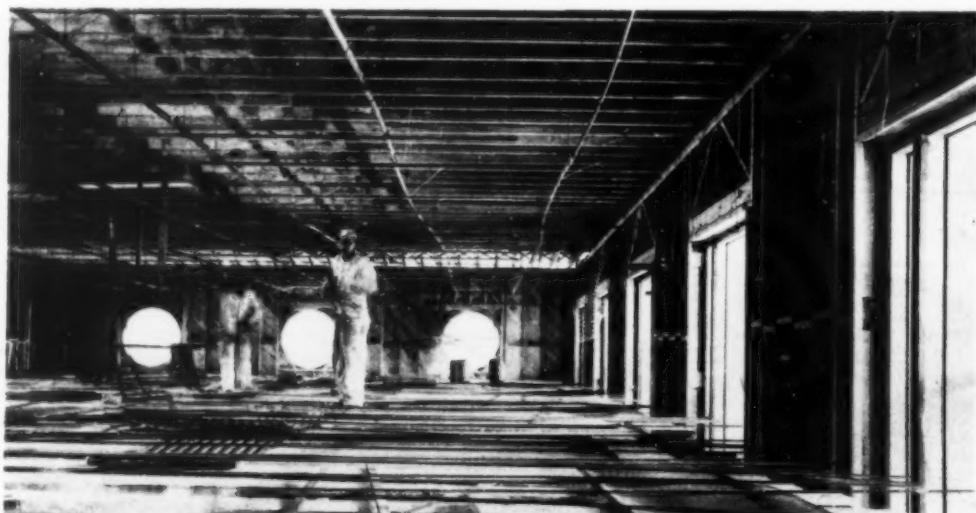
Accompanying photographs indicate progress up to the first week of March on several features of the expanded station. The temporary buildings appearing in these photographs had been completed by the group of three fixed-fee contractors already mentioned.

Continued future growth, without disturbing relations between industrial, residential and training areas, is provided for in the basic plan of the air station. Up to the present about \$33,000,000 has been allotted to construction at the station; a staff of fourteen Civil Engineer Corps officers representing the Bureau of Yards and Docks of the Navy Department has supervised this work together with additional construction amounting to about \$13,000,000 at auxiliary fields and outlying stations. Supervision has been aided by making fixed-fee contractors responsible for preliminary inspection, with final inspection by the Navy Department.

For the Navy Department, Comdr. Carl H. Cotter (CEC) U.S.N. was officer in charge of construction at the U. S. Naval Air Station, Jacksonville, Fla., from the start of the project until early in December, when he was succeeded by Lt. Comdr. Robert H. Meade (CEC) U.S.N. A three-man operating committee directs the work of the main fixed-fee contractor group, responsible for about \$16,000,000 worth of construction. This committee consists of Alexander Brest, Duval Engineering & Contracting Co.; George D. Auchter, the George D. Auchter Co.; and John E. Davis, the Batson Cook Co. Detailed designs for fixed-fee construction are prepared at the site from schematic plans of the Bureau of Yards and Docks by a project staff of Robert & Co., Atlanta, Ga., engineer-architect on a fixed-fee basis; A. J. Cooper heads this staff for Robert & Co.



WELDED STEEL FRAME for auditorium of enlisted men's recreation building is erected by Aetna Steel Construction Co., Jacksonville, for fixed-fee contractors. In background is 200,000-gal. elevated water tank put up by R. D. Cole, Newnan, Ga., above one of two water-supply units comprising well and treatment plant. Each plant pumps treated water into separate tank of 200,000-gal. capacity floating at same elevation on water supply system.

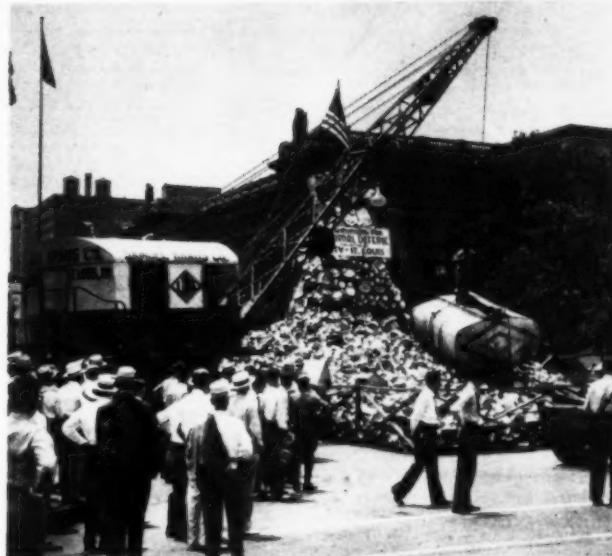


TRUSSSED WOOD FRAMING adds strength to side walls and spandrels over door heads of dining hall with 16-ft. vertical height from floor to hung ceiling which will conceal air-conditioning ducts. Workmen on temporary platform attach chicken wire to lower chords of roof trusses to support mineral wool insulation batts, installed above all ceilings next to roofs at Jacksonville Air Station. Most of installations consist of 4-in. batts, although some buildings are insulated with 2-in. batts. Roofs, in addition, are equipped with louvers and ridge ventilators.

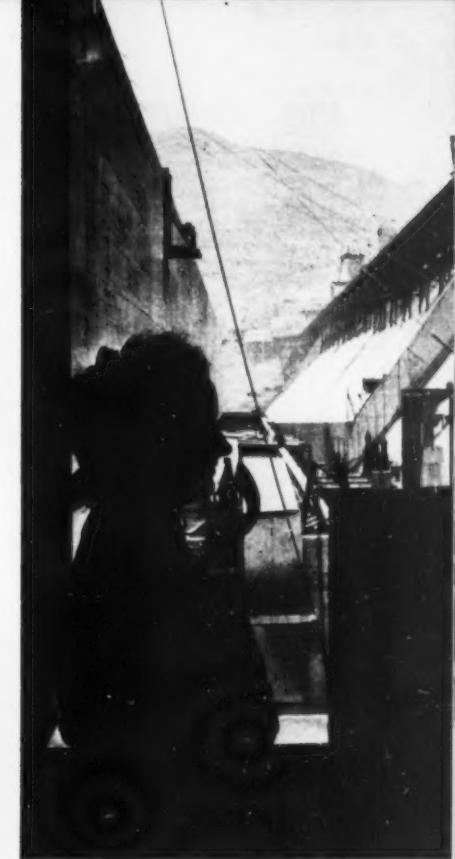
HARD Oddities



AS HE FLOATS THROUGH THE AIR with the greatest of ease, just like that daring young man on the flying trapeze, this construction worker signals "lower away," as he clings to hook of crane being maneuvered to pick up load at Friant Dam, U.S. Reclamation Bureau project in California.



ALUMINUM FOR NATIONAL DEFENSE, piled up in St. Louis, Mo., street during drive, receives prize contribution from Shell Oil Co. in form of 10,000-lb. aluminum tank which is placed on heap of pots and pans by Lima crawler crane.



"THE GREAT PROFILE" makes its bow at Grand Coulee Dam without presence of John Barrymore. Silhouette is that of Mrs. W. E. Erickson, one of four women telephone switchboard operators who have "invaded" U.S. Bureau of Reclamation's big construction job on Columbia River in Washington, formerly regarded as stronghold for men only.

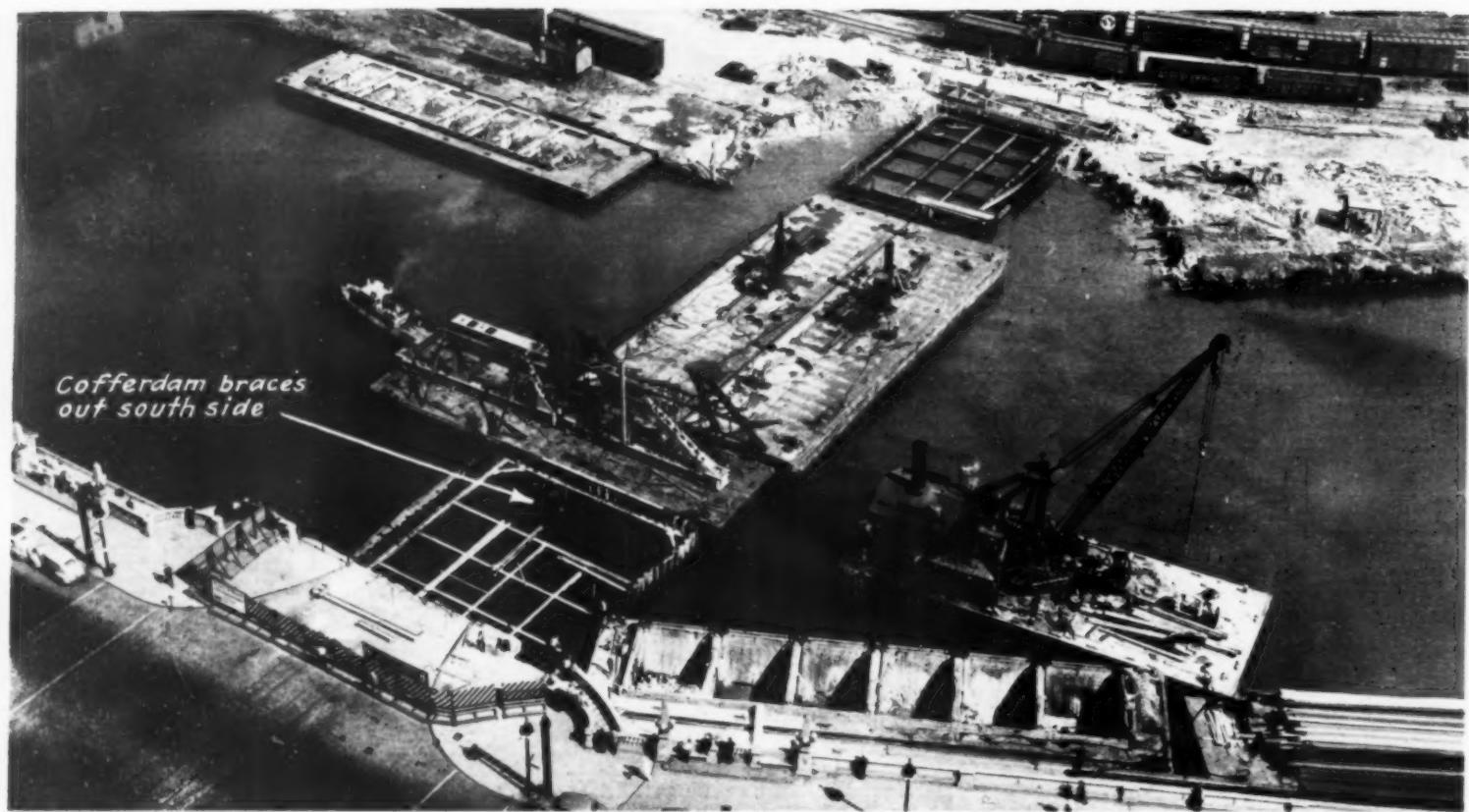


EARTH-COVERED "IGLOOS" of reinforced concrete, comprising arch roof of 26½-ft. span and 12 ft. 9-in. rise, on continuous concrete footings 8 ft. wide, are built by Bates & Rogers Construction Corp., of Chicago, to store smokeless powder and high explosives at \$28,000,000 Kingsbury Ordnance Plant near LaPorte, Ind. Igloos are built in lengths of 40, 60 and 80 ft. and are covered with an earth blanket with minimum thickness of 2 ft. In charge of construction of Kingsbury project are Major W. J. D'Espinosa, representing Army Ordnance Department and Major Benjamin T. Rogers, constructing quartermaster.

SILVER EAGLES GET DUNKING (below) as men of Army's 108th Combat Engineers toss Col. Karl Hobart into Red River from pontoon bridge erected at Fulton, Ark. When work on bridge was started at 6:30 a.m., Colonel told his men they could throw him into stream if they finished job before noon. They did.

Associated Press Photo

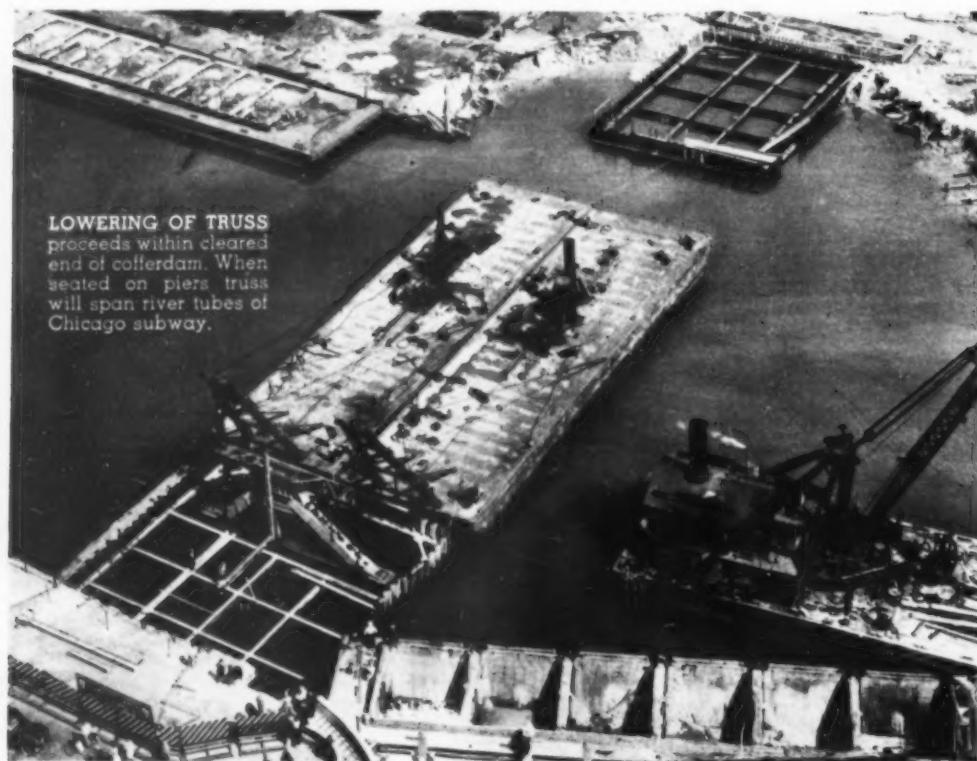




HEAVY TRUSSES, weighing 75 and 83 tons, respectively, are delivered by barge. Pair of A-frame derricks start to lift 75-ton truss from barge and lower it to place within cofferdam, (from which bracing at end has been removed) at south river pier. Second truss on barge will later be placed at north pier across river.



ENGINEERING AND CONSTRUCTION PERSONNEL on North State St. bridge project includes (left to right): CARL O. JOHNSON, resident engineer; CLARENCE S. ROWE, engineer of bridge construction; JOHN ROACH, general superintendent for FitzSimons & Connel Dredge & Dock Co.; RICHARD FOX, project superintendent; and W. W. DEBERARD, city engineer of Chicago.



LOWERING OF TRUSS proceeds within cleared end of cofferdam. When seated on piers, truss will span river tubes of Chicago subway.

Heavy Trusses

Spanning Subway Tubes Lowered Into River

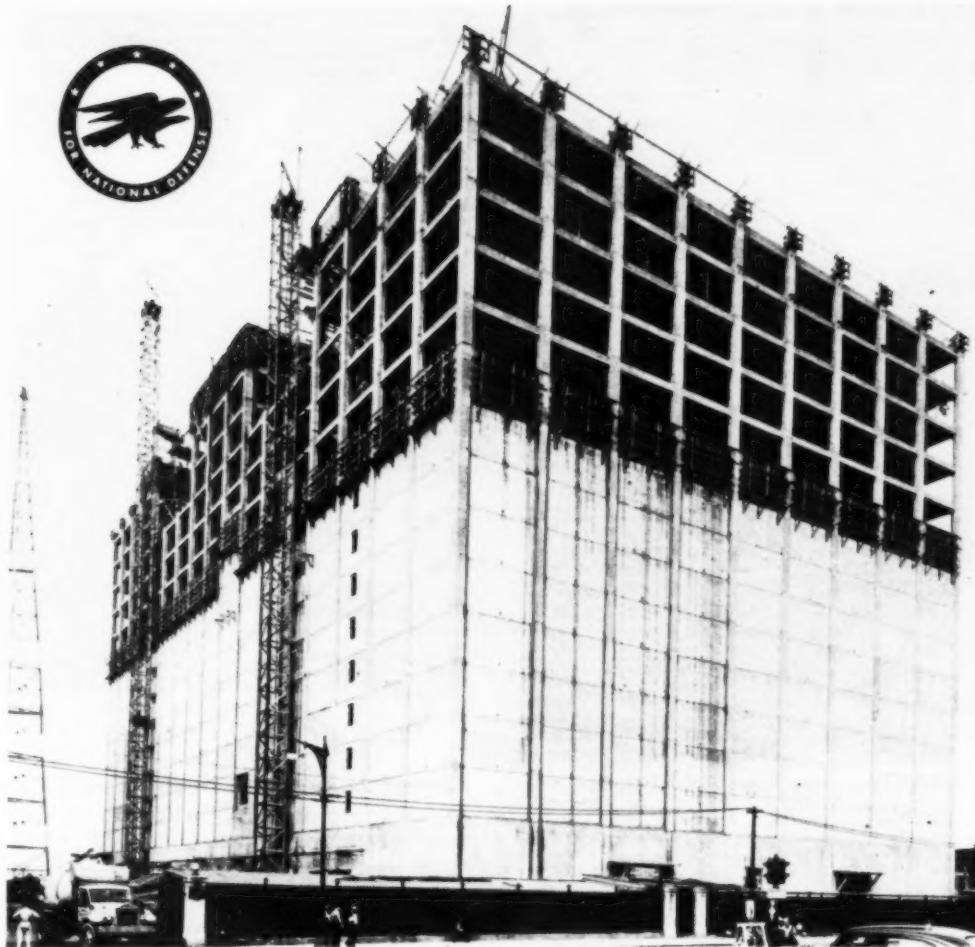
At Bridge Piers

IN THE CONSTRUCTION of the North State St. bridge, Chicago, it was found necessary to use heavy structural steel trusses (75 and 83 tons) embedded in the river piers, as the front walls of the concrete masonry pits are called. While uncommon, this is not unprecedented, as the North LaSalle St. bridge is similarly supported and for a similar reason.

The State St. bridge is to have three trusses per leaf, and ordinarily the river piers would have a large concrete sub-pier under each of these trusses, carrying the heavy live-load reaction down to bedrock. However, the width and location of subway tubes passing under the bridge is such that the sub-piers could not be arranged in this manner. Instead, they were spaced to clear the subway tubes — some of them having been already built by the subway contractor in conjunction with the tube work — and the steel trusses were designed to transfer the center truss reaction laterally to the sub-piers.

The accompanying photographs illus-

(Continued on page 96)



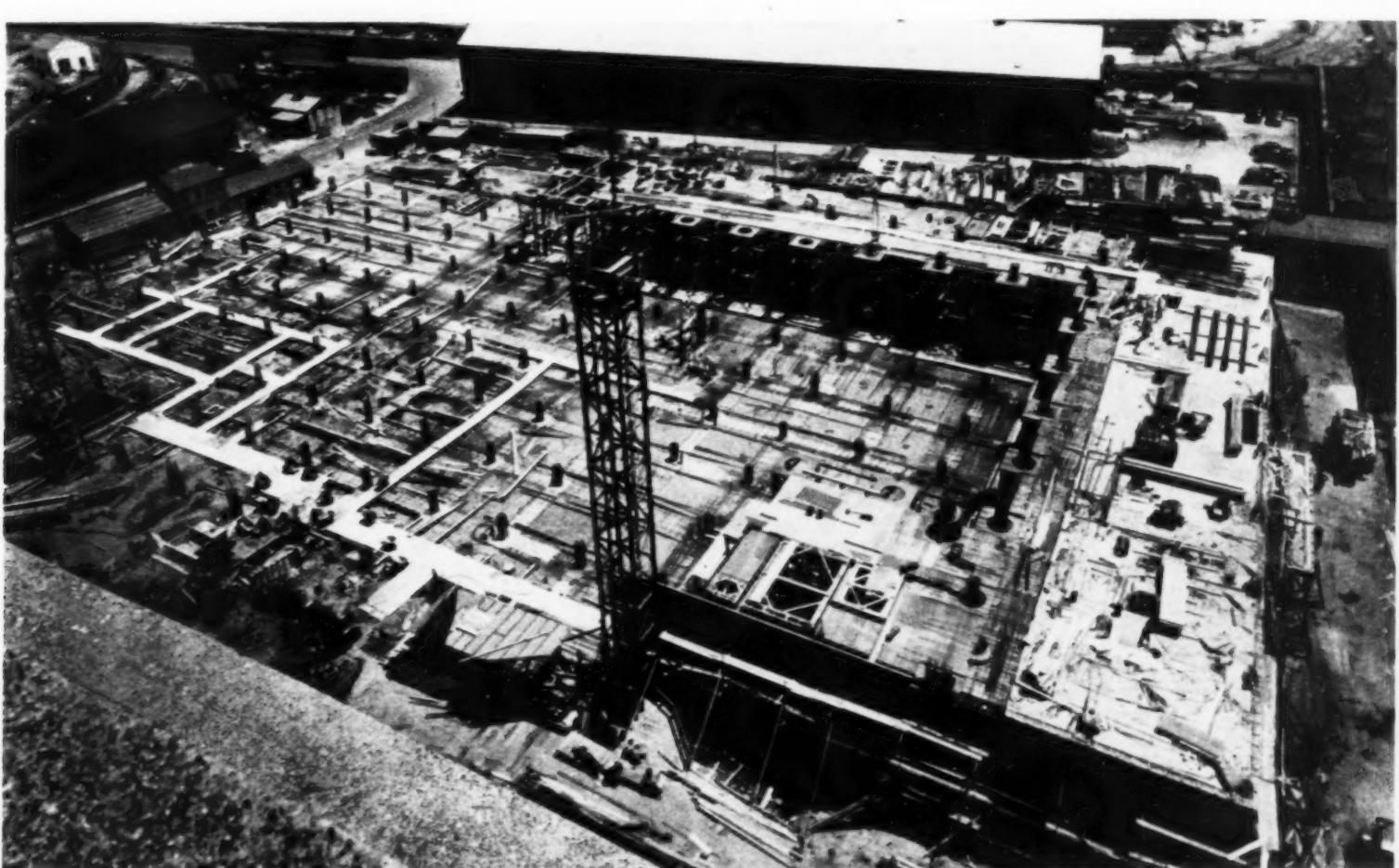
FORMS FOR SECOND FLOOR are being set at Brooklyn Navy Yard 16-story concrete storehouse. On building providing 21 acres of floor space, progress was at rate of one complete floor with its supporting columns every 3 days.

CONCRETE STOREHOUSE AT NAVY YARD

Built in 48 Days

CONSTRUCTION OF MORE THAN 21 ACRES of floor space in 48 working days has signalized the progress of work by the Turner Construction Co., general contractor, on the new 16-story storehouse and office building being erected at the Brooklyn Navy Yard, New York City, for the U. S. Navy. The roof of this all-concrete structure was topped out one month ahead of schedule. The building, containing more than 952,000 sq.ft. of space, was designed by the Navy's Bureau of Yards and Docks and was constructed under the direction and supervision of Rear Admiral Ben Moreell, (C.E.C.), U.S.N., chief of the bureau, Captain William H. Smith, (C.E.C.), U.S.N., officer in

(Continued on page 98)



16-STORY STOREHOUSE of concrete construction is windowless for first eleven stories. In this view exterior walls are complete to tenth floor and floor slabs have been poured for entire 16-story structure. Vertical tower hoists deliver concrete to desired floor levels. Forms are in place for exterior walls at tenth floor level.



12,518-ACRE SITE at Fort Custer, Mich., contains wide range of buildings to house and service Army establishment of 21,000 officers and men.

ROAD CONSTRUCTION (below) within fort area involves laying of 3-in. stabilized gravel base course with Barber-Greene tamping-leveling bituminous finisher. This machine, one of two units employed by Louis Garavaglia, contractor, is equipped with extensions for laying any kind of bituminous mix up to 12 ft. wide. Alongside machine is one of Army's new reconnaissance cars and in background is typical two-story wood barracks building.



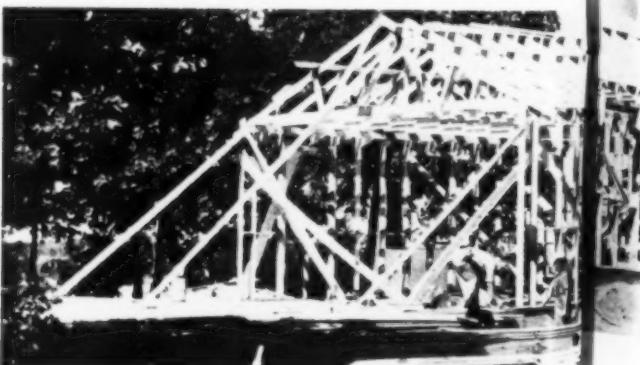
SERVICE CLUB (below) is large wood frame structure.



NINE HUNDRED AND EIGHTY-ONE BUILDINGS spread over 12,518 acres of ground, and accommodating about 21,000 officers and men, together with a mile-square airport field and facilities, are provided by enlargement of Fort Custer, Mich., one of the nation's major military training centers. About a year ago, on Aug. 17, 1940, there were but few structures on the reservation which consisted, mainly, of barren fields. Today, buildings of all types, erected or near completion, stretch for miles along a modern, four-lane highway.

The original fort expansion is now essentially complete, with required housing provided and utilities in operation. It involved erection of 894 buildings. The secondary expansion project, involving erection of 87 buildings of various types, is scheduled for completion on Nov. 30, 1941.

Construction at Fort Custer was done largely by contract under the direction of the Army's Quartermaster Corps; Captain Alfred B. Plaenert, Q.M.C., is constructing quartermaster. Among the contractors for the Fort Custer project were: Owen-Ames-Kimball Co., Grand Rapids, Mich.; A. W. Kutsche, Detroit, Mich.; and Louis Garavaglia Co., Detroit, Mich.





HOSPITAL AREA contains one-story wood buildings interconnected by covered walkways.



PILE DRIVING (right) to provide substructure (below) for bridge across Kalamazoo River



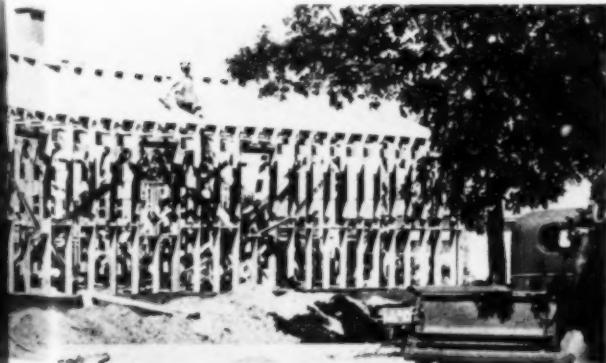
STANDARD GAGE RAILWAY SPUR is built by Jones Contracting Co. to provide connection with airport.

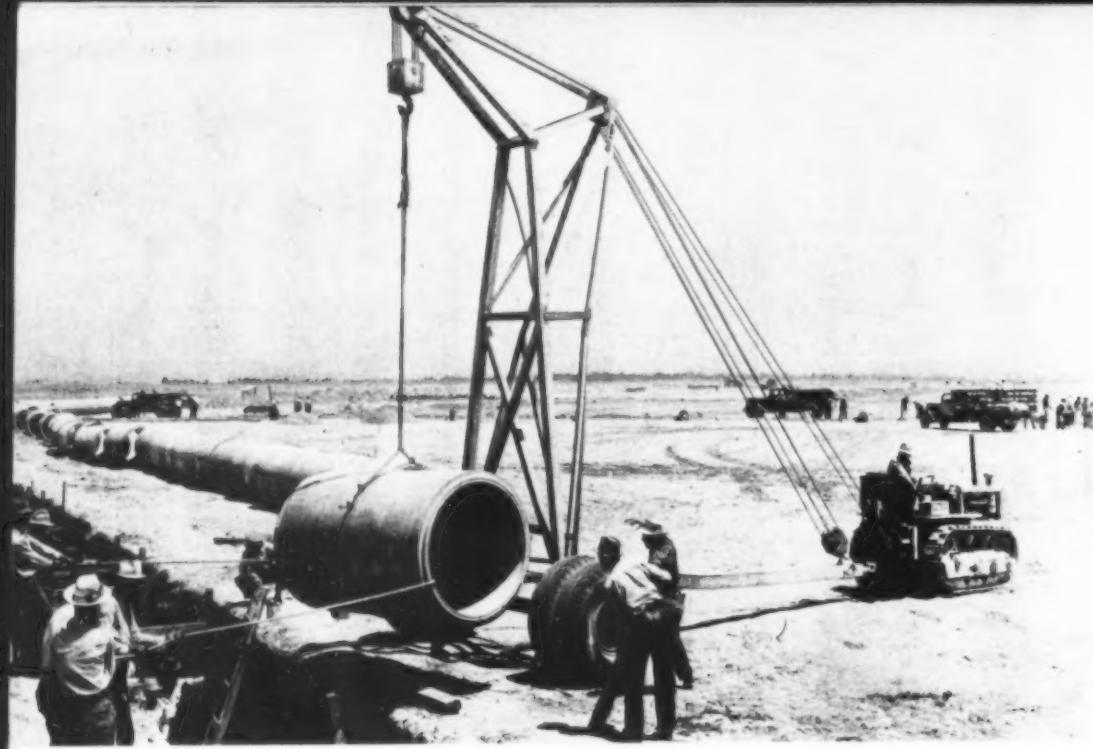


LAUNDRY BUILDING (below) is one of many structures, other than barracks, required to service Fort Custer establishment.

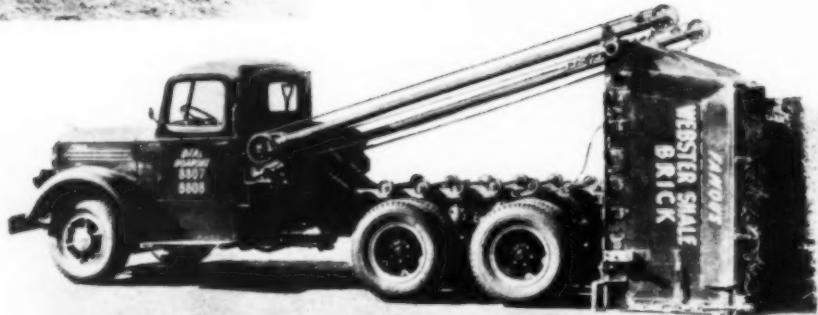


WOOD FRAMING (below) is being erected for one of service clubs.





MOBILE TRACTOR-CRANE (left) places 3½-ton section of 48-in. diameter concrete pipe, 8 ft long, in trench at Litchfield Airport, Phoenix Ariz. Mounted on pneumatic-tired wheels, LeTourneau unit has 20-ft mast of all-welded construction and is operated by cable from power takeoff unit on Caterpillar tractor.

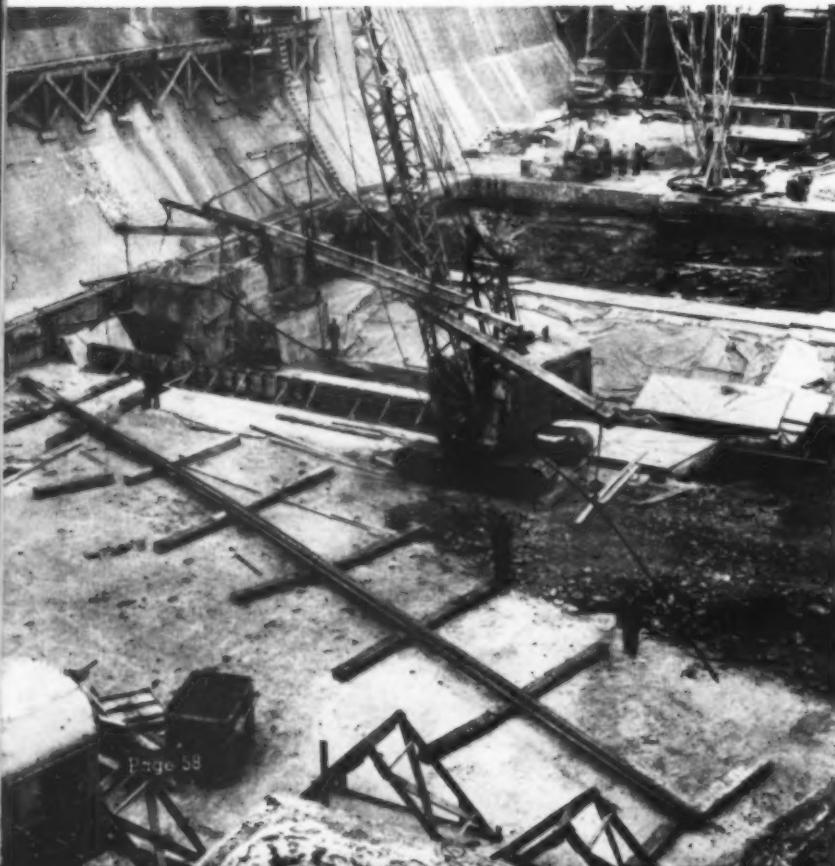


LARGE LOADS OF BRICK (two photos above) for construction use at Indiana Ordnance Works, Charlestown, Ind., are deposited in neat piles from six-wheel Mack truck by special Fontaine brick body. With this equipment, operated by Roanoke-Webster Brick Co., Roanoke, Va., brick are not chipped or broken by dumping, but are laid down quickly and gently in stacks at exact spot desired. Pallet boards are not required, as pneumatic gripping device holds load for safe and convenient handling. Body holds 4,000 brick.

HOW They Did It

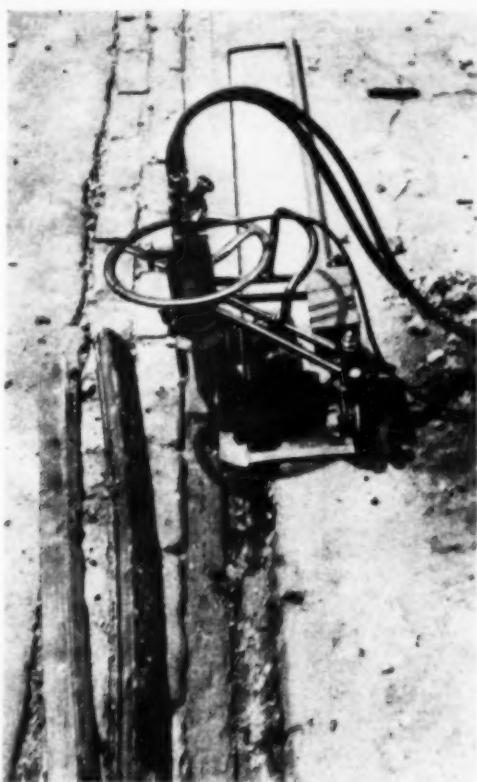
CONSTRUCTION DETAILS

For
Superintendents and Foremen

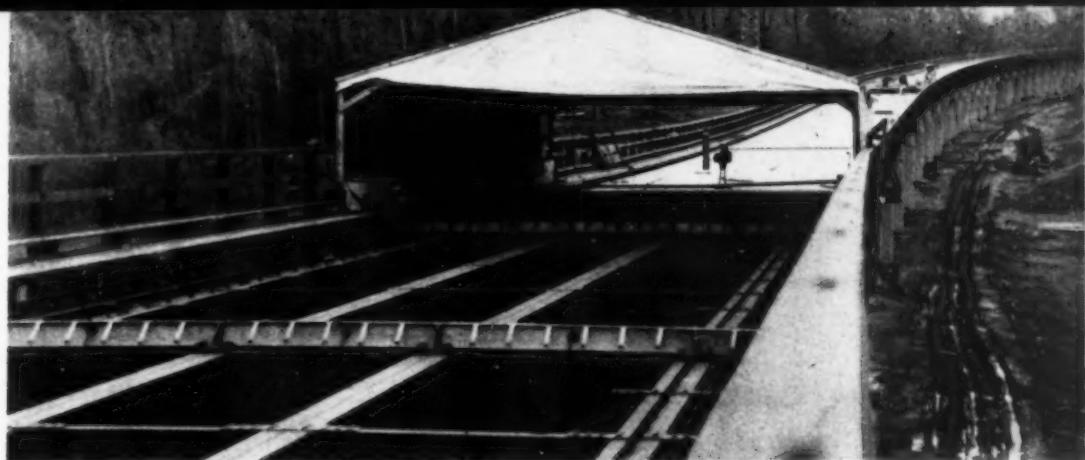


SPECIAL YOKE (left) on cable from crawler crane enables Wood Bros. Construction Co. to handle extra long steel reinforcing bars for construction of power plant at Fort Peck Dam, U.S. Engineer Department structure in Montana. Reinforcing bars are 1½ in square in cross-section and 113½ ft. long.

AUTOMATIC DUMPING DEVICE (above) unloads car of muck from east portal of Continental Divide Tunnel of U.S. Bureau of Reclamation's Colorado-Big Thompson project. Detachable arm on Cerd muck car of S. S. Magoffin Co., contractor, strikes ramp along track at spoil bank and as car is hauled forward, catch holding side of car is released and car is tilted to discharge contents.



ABANDONED STREET CAR TRACKS. providing scrap steel urgently needed for national defense purposes, are removed with aid of Linde oxy-acetylene portable cutting machine operating on special track. Cutting blow pipe is equipped with bevel-cutting nozzle which makes single cut at angle along groove of rail, severing top of rail from web in two longitudinal sections. Cut rail is then removed with pinch-bar, without damaging adjacent pavement.



ROLLING TENT spanning roadway of Mississippi River bridge at Greenville, Miss., is used by F. V. Ragsdale and W. L. Sharp Construction Co., of Memphis, Tenn., to protect from rain placing and finishing 9,957 lin.ft. of 24-ft-wide concrete deck. Designed by L. L. Talbot, superintendent and H. C. Blazer, job engineer, canvas-covered wood-frame mobile tent is 80 ft long and 27 ft wide. It has end curtains that roll up. Tent shelters green concrete from beating of rain that might wash away surface finish and also shades fresh concrete from sun until covering of wet burlap can be applied. In cold weather salamanders are placed under tent to prevent freezing of concrete.—Photo from L. D. BROWN, resident engineer for Ash-Howard-Needles & Tammen, consulting engineers for new bridge.

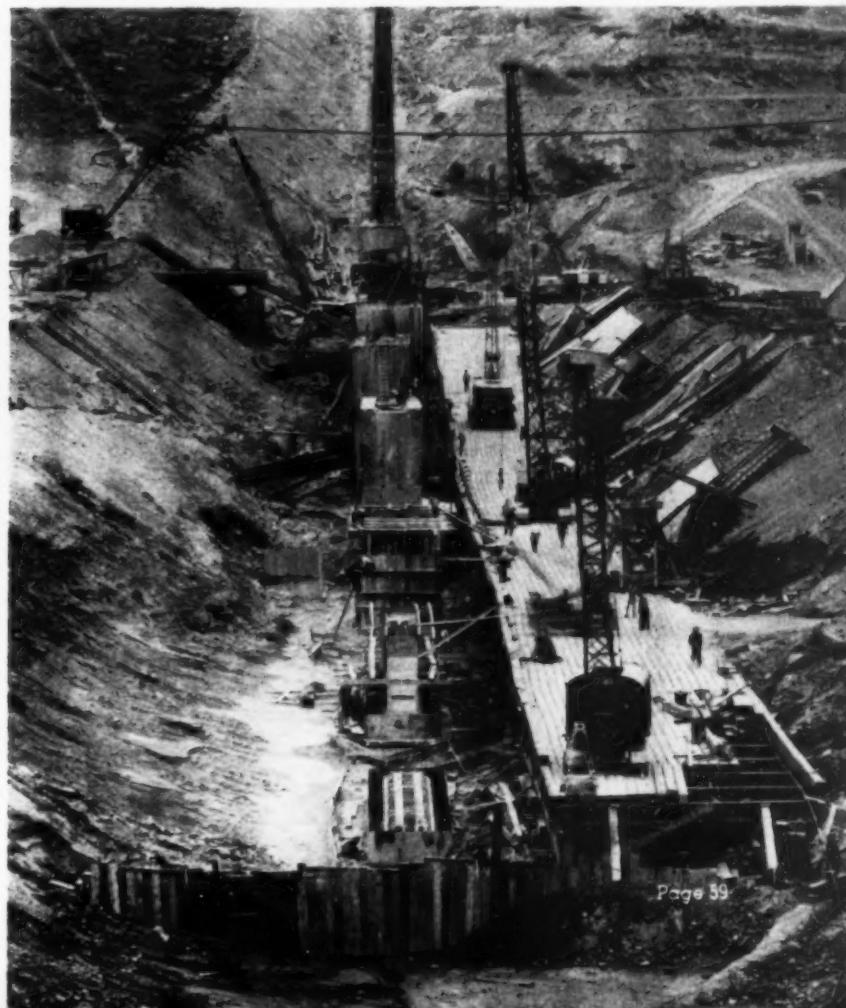


PORTABLE BELT CONVEYOR and truck ramp are set up by TVA workers to place earth fill in timber barricade erected in advance between sites of evaporating and crystallizing houses for ammonium nitrate production at fertilizer plant No. 2 near Wilson Dam, Muscle Shoals, Ala.



SAFETY FIRST is object of this ladder-gate on stake-body truck used to transport construction workers to and from job. After passengers are aboard, ladder swings up on hinges and is locked in position.

CAISSON CONSTRUCTION AT MERRIMAN DAM (below), rolled earth embankment about 200 ft high, at Lackawack, N. Y., for New York City Board of Water Supply's Delaware River aqueduct system, is employed by Mason & Hanger Co., contractor, to carry 2,788-ft long concrete cutoff wall to bedrock along axis of dam. Rectangular concrete caissons are sunk from bottom of trench 45 ft. wide, excavated to average depth of 38 ft. to reduce depth of overburden. Depth to which 18 caissons were sunk ranged from about 46 ft. to maximum of 144 ft. below trench bottom. Caissons were 45 ft. long and from 10 to 12 ft. wide, and contained two rectangular muck shafts for operation of clamshell bucket and one man shaft.





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toughest job you have—Model 112.

ALLIS-CHALMERS LEANING FRAME GRADERS

Here the Leaning Frame Grader roots up old ground and then smooths out surface on an airport project, Buffalo, N. Y.

No matter how tough the job, you get it done quicker with this all-round grader.

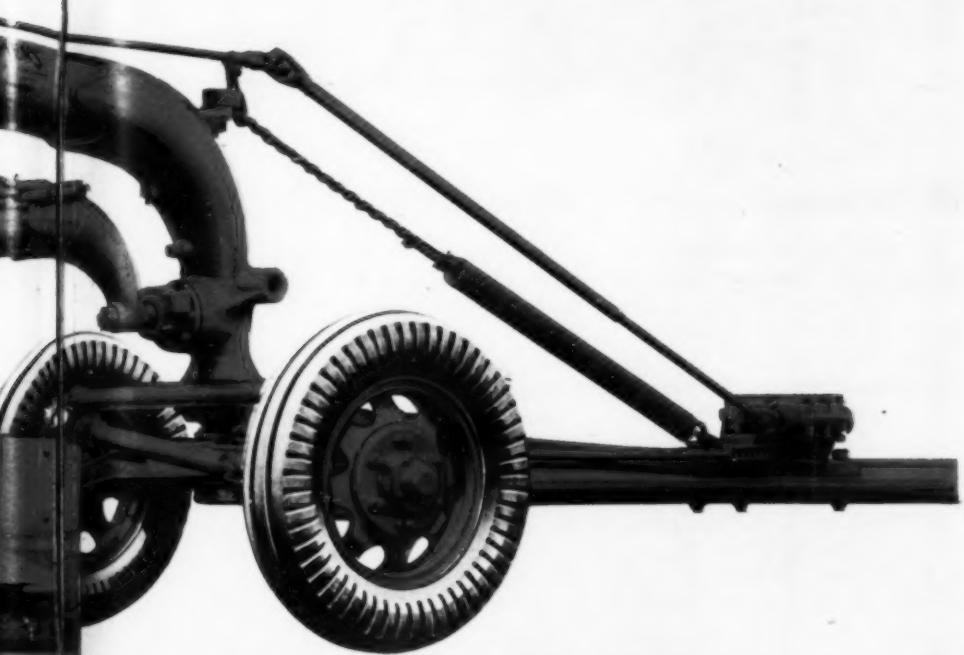


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Work both ends of your tractors—use them as bulldozers and with Leaning Frame Graders. Get twice as much work out of your investment.

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TRACTOR DIVISION
MODEL 112 — 12'-FOOT

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Available Now!

Why hold up your grading work? Use pull-type graders—Allis-Chalmers Leaning Frame Graders. They'll do everything a motor grader can do ... and take on other work a motor grader can't touch. They'll go through any grading job ... faster, with less effort, at lower cost than any other pull-type outfit. They're NEW! They're MODERN! They're AVAILABLE!

Introduced only a few years ago, Leaning Frame Graders are already making dirt-moving history ... on the toughest kind of work—from rough grading to finishing ... on leveling and clearing. Leaning Frame doubles the grader's efficiency—gives you extra pressure for taking deeper bites ... a wider blade range ... greater stability ... more operating comfort. Slopes are always uniform—operator need only keep his platform level and the blade automatically cuts straight and true. Strong...simple construction...power controlled! Advantage after advantage ... all described in the Leaning Frame Grader catalog! Write for your copy. See your Allis-Chalmers dealer ... NOW!



Leaning Frame gives greater stability—enables you to cling tightly to your work on steep banks.



Model WK tractor and the 110 grader slope a bank for Wise County, Bridgeport, Texas.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE • U. S. A.
2-FOOT BLADE • MODEL 110 — 10-FOOT BLADE

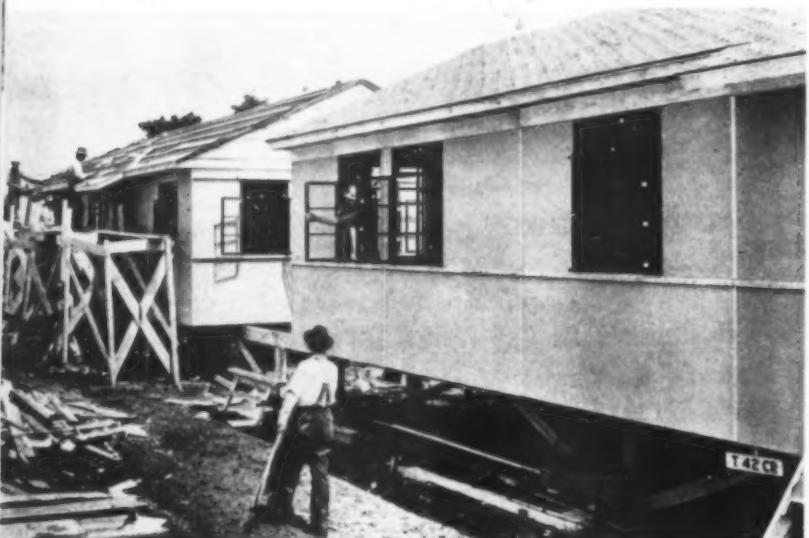


ALLIS-CHALMERS
POWER CONTROLLED BLADE GRADERS
10 FOOT • 12 FOOT

Write for free, descriptive Leaning Frame Grader catalog...NOW!



COMPLETED HOUSE with wall joints battened between units is given finish coat of paint. Exterior siding is fiber insulating board, except for wood shiplap on gable ends. Foundation inclosure is asbestos-cement sheet attached to vertical steel T-sections.

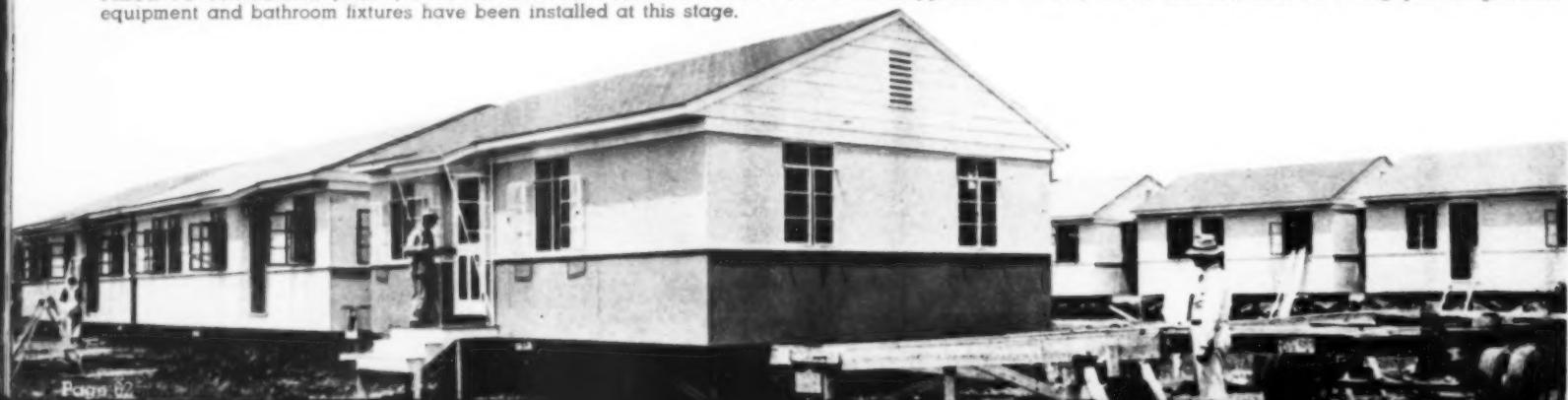


HOUSES TAKE FORM as they advance toward delivery end of assembly line. Sectional units, bolted together during house construction, are mounted on wheels which travel on pipe rails.



PRODUCTION YARD builds 150 demountable, sectional houses for distribution to scattered lots in four nearby communities. Yard procedure is based on assembly line methods, with series of houses advancing through successive stages of construction on each of five lines.

PRIOR TO UNBOLTING (below) of sectional units, house receives final touches as it approaches delivery end of assembly line. All wiring, plumbing, kitchen equipment and bathroom fixtures have been installed at this stage.

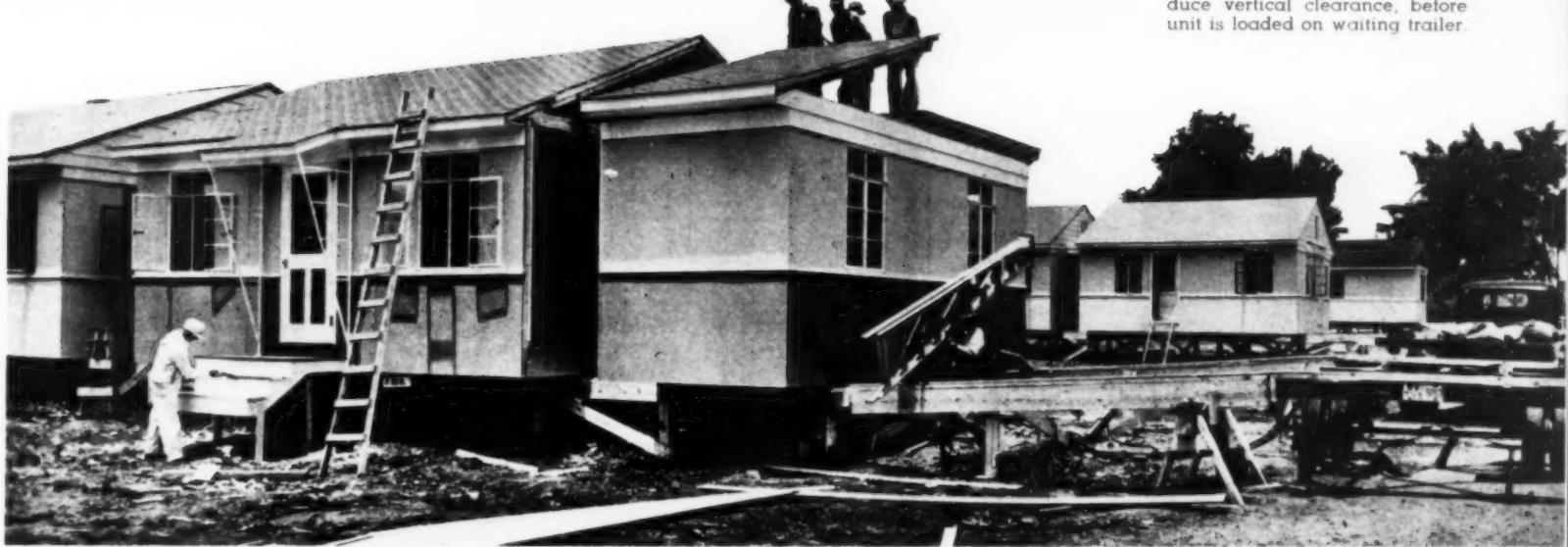


Demountable Sectional Houses PREBUILT IN CENTRAL YARD

ACTING AT THE REQUEST of the Federal Works Agency, the Tennessee Valley Authority has designed and constructed for defense industry employees in the Alabama Tri-Cities area 250 individual houses of which 150, of the demountable type, were prebuilt in a central yard and delivered in sections to prepared foundations, as indicated by accompanying photographs and drawings. So successful and economical were the mass-production methods developed in assembling these 150 houses that the same process was adopted by an independent contractor to enable him to put in the low bid for another 300-unit housing project in Tennessee. Being now satisfied of the commercial practicability of the construction method, TWA is actively interested in making its use available to private builders.

Preliminary Experiments — During a period of experimentation, a hundred houses, roughly similar to those under discussion but built by conventional construction methods, were begun in the Muscle Shoals area as part of the total of 250 houses. At the same time, ten demountable, sectional tourist cabins were built experimentally at a central shop for use at one of the Authority's recreational properties, as described in *Construction Methods*, May 1941, page 70. Successful culmination of the experiment with these units gave assurance that the demountable construction method was

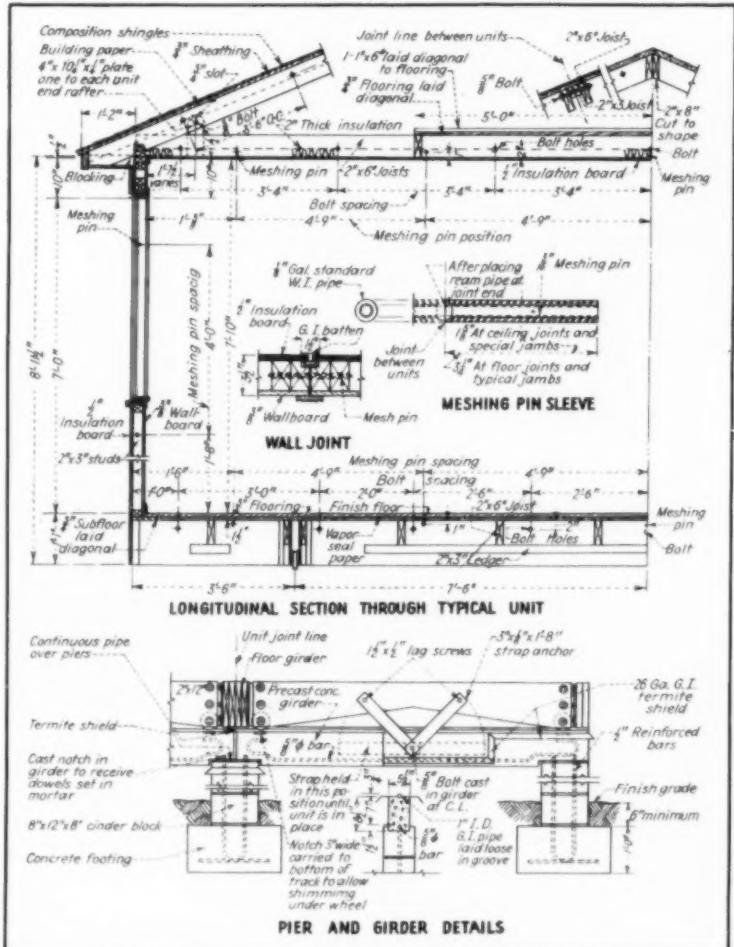
COLLAPSIBLE ROOF of first sectional unit is folded down, to reduce vertical clearance, before unit is loaded on waiting trailer.



adaptable to the remaining 150 houses in the defense project.

On that basis, the remaining 150 individual houses of the defense housing project were built in a single production yard by mass production methods and were distributed by trucking to individual and grouped lots in the Tri-Cities area, which actually embraces four towns: Florence, Sheffield, Tuscaloosa, and Muscle Shoals. The properties, as well as the houses, remain in the ownership of the Federal Works Agency under the Lanham Act, and they are deliberately so distributed within the communities that they may be sold to their occupants or to investors in small groups at any time the Administrator of FWA sees fit to do so.

Types of Houses—Three sizes of one-story houses, without basements, were included in the project. Type B, containing two bedrooms, had frame dimensions 22x30 ft.; type C, with three bedrooms, 22x37½ ft.; and type D, with one bedroom, 22x22½ ft. The project was made up of 60 per cent type B and 20 per cent each types C and D. Prebuilt houses were





LOWERED ON TO TRACK temporarily extended under raised unit, house section is rolled ahead on to foundations.

constructed intact, with all equipment installed, on building ways at the yard and were separated into units, each 22x 7½ ft. in plan, for transportation and assembly at the sites.

Roof Design—Demountable construction is particularly applicable to flat-roof houses because the sections of these houses, while in transport, readily conform to available road clearances. For that reason flat roofs were used on the experimental tourist cabins. For the workmen's housing, however, especially as the houses were to be distributed within existing communities, it seemed better not to buck the general preference of the public for gable roofs, par-

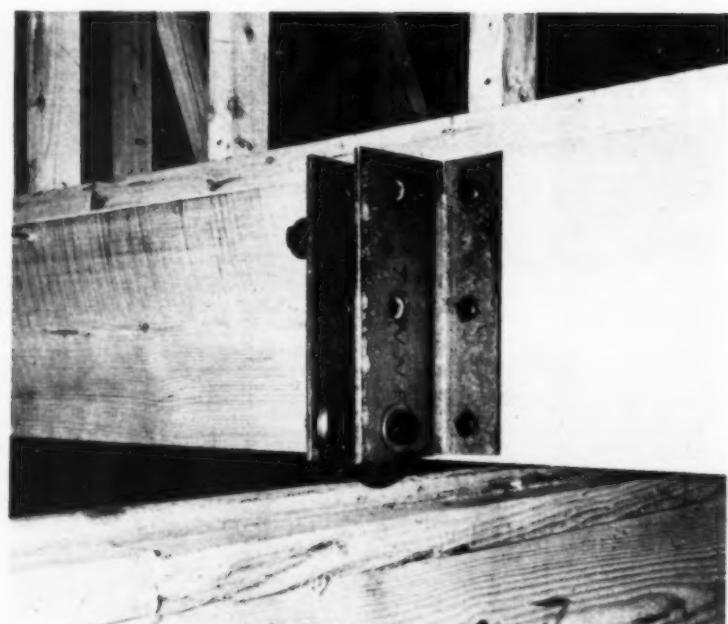
(Continued on page 86)



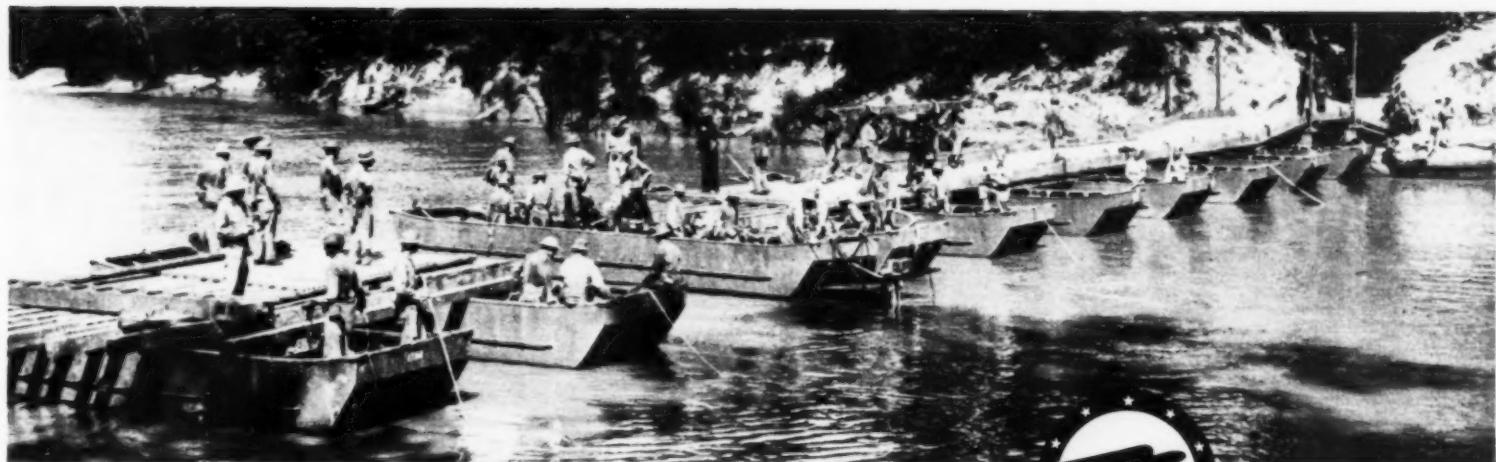
FINAL SECTION of house rolls over extended track rails into position on foundations for bolting to preceding unit.



ROOF PANELS of final unit are raised to permit installation of prebuilt gable end.



WHEEL MOUNTING to travel on pipe rail consists of stock pulley sheave turning on bolt axle between steel angles lag-screwed to floor girder.



LAST PONTOON is moved into position by 17th Engineers as bridge decking is extended simultaneously from both banks of river.



KNEE-DEEP IN WATER. groups of 17th Engineers set trestle bent to form Texas shore connection with floating pontoon structure extending from Louisiana side of stream.

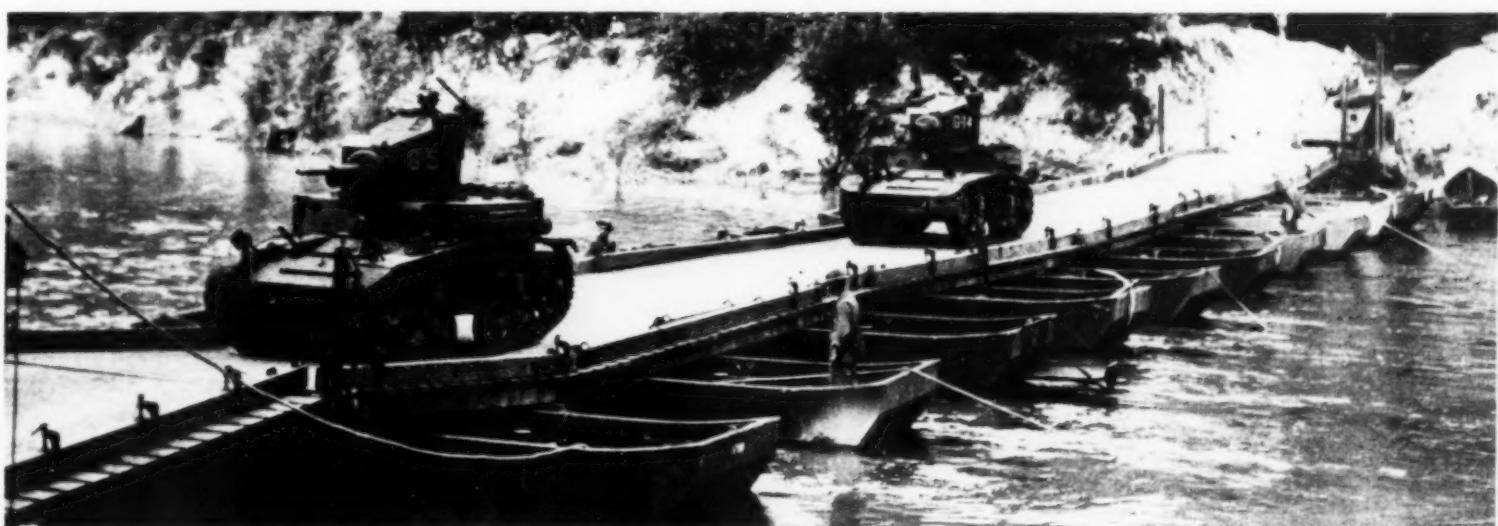
With Pontoon Bridge

Army Engineers Pave Way

For Tank "Attack"

IN A SIMULATED "ATTACK" on Texas from Louisiana by a force of the Second Armored Division, U. S. Army, a battalion of the 17th Engineers from Camp Polk, La., under command of Major Howard L. Peckham, prepared the way for the advance of tanks by constructing in less than 2 hr. a 250-ft. long pontoon bridge across the Sabine River, between Converse, La. and Mike's Ferry, Texas. Preparations for building the river crossing started at 8:30 a.m., and consisted in ferrying a portion of the bridge-building material across the stream in light 11-man assault boats under cover of a smoke screen so that actual construction could be carried on from both banks toward the middle. Beginning actual construction of the pontoon crossing at 10:15 a.m., the bridge was completed and ready for service by mid-afternoon. The accompanying photographs illustrate stages in the operation and the methods and material employed.

Army Photos

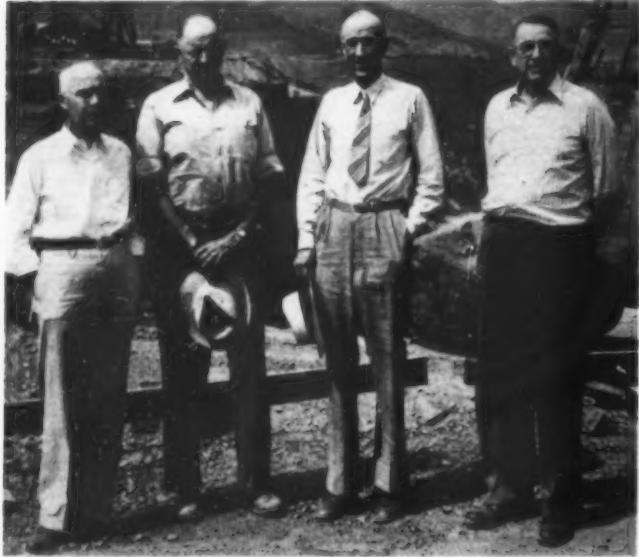


AS LAST SECTION of deck is placed, column of "attacking" light tanks rolls across completed pontoon structure linking Louisiana and Texas banks of Sabine River. Construction was carried on from both banks of stream.



MOVING OF 5-STORY HOSPITAL to make way for East River Drive in New York City, is witnessed by (left to right): CHARLES SPENCER, of Spencer, White & Prentis, Inc., contractors; MAYOR F. H. LAGUARDIA; and IRVING V. A. HUIE, Commissioner of Public Works and WPA administrator for New York City.

Wide World Photo



DAM BUILDERS line up, with U. S. Bureau of Reclamation's Shasta Dam in California as appropriate background. (Left to right): J. L. SAVAGE, chief designing engineer, U.S.B.R.; FRANK CROWE, general superintendent, Pacific Constructors, Inc.; S. O. HARPER, chief engineer, U.S.B.R.; and RALPH LOWRY, construction engineer for U.S.B.R. on Shasta Dam.

Present and Accounted For A PAGE OF PERSONALITIES



MEMBERS OF "THE MOLES," organization of New York tunnel and heavy construction men, come up for air at recent annual Long Island Clambake. (left to right): HENRY LIEBMAN, N. Y. City Dept. of Public Works; PINCUS RIZACK, S. A. WINETT and F. J. McGARRY, latter three connected with office of President, Borough of Manhattan, on East River Drive project.

CONSTRUCTION PERSONNEL of Tennessee Valley Authority is assigned to new duties as work of building dams for flood control and power development expands. Recent appointments include: (1) R. V. SASS, construction superintendent, Chatuge Dam. (2) E. A. PROKOP, construction engineer, Ocoee No. 3 Dam. (3) GEORGE K. LEONARD, project manager Hiwassee projects, including Apalachia, Nottely, Ocoee No. 3 and Chatuge Dams. (4) THOMAS F. TAYLOR, construction engineer, Cherokee Dam.



1



2



3



4



13-STORY NAVY BUILDING

Up in 37 Days



THIRTEEN-STORY STRUCTURE consisting of reinforced concrete frame and floors with brick exterior walls was erected on previously prepared foundation in only 37 days.

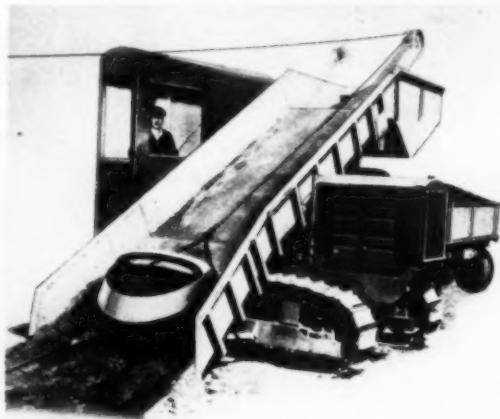
CONCRETE WAS DELIVERED to floor levels by tower hoist. Pour requiring 260 cu.yd. per floor was completed in from 4 to 8 hr., beginning in early evening.

ONLY 37 DAYS were required by the Corbetta Construction Co., of New York City, to top out a 13-story concrete-frame building, Wallabout Houses, containing 207 living units, erected in the vicinity of the Brooklyn Navy Yard, New York, to house the influx of Navy enlisted personnel based at that point since the tempo of national defense activities has been stepped up. Erection of the superstructure, on foundations begun June 9, was started June 30 and the roof was in place Aug. 29. Two complete sets of floor and column forms and the use of high-early-strength cement to permit early stripping of forms were factors that contributed to the rapid progress achieved. Each floor, covering 10,500 sq.ft. and requiring 260 cu.yd. of concrete, was poured in from 4 to 8 hr., beginning in the early evening.

Including interior finish, the contract cost of the structure was \$607,000, equivalent to 39c. per cubic foot of building volume. For the Corbetta Construction Co. Frank Marr was general superintendent, Hans Jacobson superintendent on foundation work and Edward Stearne project manager. Construction was supervised by the New York City Housing Authority for the U.S. Housing Authority.

CONSTRUCTION EQUIPMENT NEWS

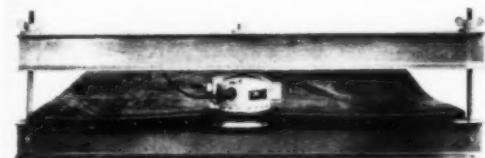
CRAWLER-MOUNTED SCRAPER-LOADER has hydraulically controlled "teetering" ramp, 1-cu.yd. Crescent scraper bucket and 400-ft.-long drag cables. Scraper bucket is powered by double-drum hoist driven either by 60-hp. gasoline or diesel



engine or by 40-hp. electric motor. Power is furnished to crawlers by takeoff on hoist. In handling loose material from pit, bank or stockpile 400 ft. wide, machine is said to load average of eight 5-ton trucks per hour, provided bucket is operated to maintain average length of haul of 200 ft. When moving from job to job, "teetering" ramp is raised and held in place by hydraulic rams.—**Sauerma Bros., Inc.**, 432 S. Clinton St., Chicago, Ill.

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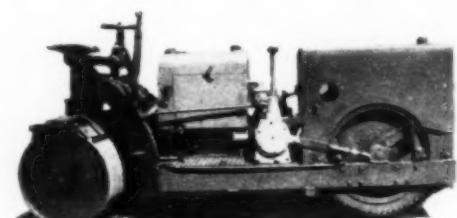
PATCH VULCANIZER, designed for repairing covers of conveyor belting, is round in shape, 10 in. in diameter and of single heated platen type. Clamps



against steel plate 12 in. in diameter held against opposite sides of belt.—**B. F. Goodrich Co., Akron, Ohio.**

★ ★ ★

TANDEM ROLLER for use of paving contractors is all steel, electrically welded unit weighing 3 tons and having wheelbase of 82 in. Frame is made of $\frac{3}{4}$ x6-in. steel and has four heavy cross members. Welded steel front yoke has 2½-in. king bolt that turns on two bronze bushings and heavy ball thrust bearing which carries weight. Rear roller is 37 in. in diameter and 36 in. wide. Rim is $\frac{3}{4}$ in. thick and has heavy steel ends with 2-in. plug for water and $\frac{1}{4}$ -in. air hole. Front rollers are 27 in. in diameter and 34 in. wide. Shells are $\frac{5}{8}$ in. thick. All bearings equipped with zirk oilers. Powered by 4-cylinder water-cooled Waukesha motor with 2½x 3½-in. bore and stroke. Gear box consists of two



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of a fast contract schedule"

— says contractor on huge airport project*



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*Mauger Construction Company of Columbus, Ohio, and Charleston, West Virginia, and the F. C. Samons Construction Company (associated with the foregoing) of Huntington, West Virginia, are moving an average of 27,000 cubic yards a day on this huge airport project at Cumberland, Maryland, with the help of Gulf quality lubricants and fuels.

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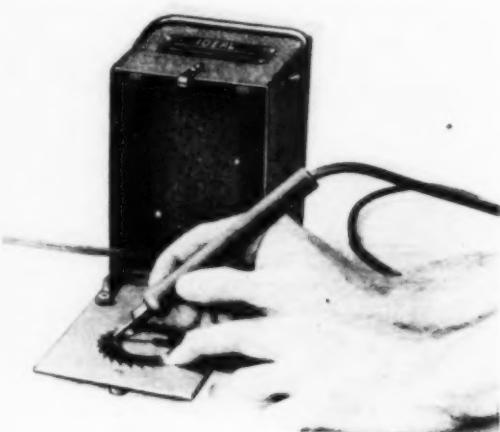
AMES BALDWIN WYOMING CO.

Parkersburg, W. Va. North Easton, Mass.

hardened steel helical bevel gears with pinion meshing into both. Pinion is carried on heavy ball bearing and has short flanged shaft which bolts to fly wheel of engine. All gears and bearings enclosed and run in oil bath. Ford truck transmission gives roller four speeds in either direction. Power is transmitted from small sprocket to rear drive sprocket by extra heavy roller chain. Two sprockets held apart by turnbuckle which relieves frame of all strain. Rear sprocket and 25-in.-diameter brake drum are securely welded to one end of rear roller. Water tank, 45-gal. capacity, is mounted above rear roller and supplies water to both rollers.—Wheeler Manufacturing Co., 4673 Alger St., Los Angeles, Calif.

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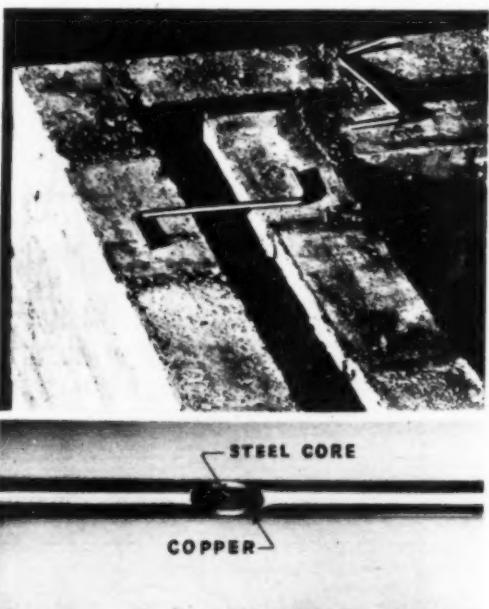
ELECTRIC ETCHER, called "Thin Line," for permanently marking small tools and parts, writes with fine line, burning mark, identification number or name right into metal so it cannot become



blurred or worn off with ordinary usage. Unit includes 9-ft. primary lead and plug, 2-oz. heat-resisting hand piece with 3-ft. lead, 4x6-in. work plate, 115-v., 50-60 cycle standard. Etching heat 124 watts. Weight, 5 1/4 lb. Size 4 1/4 x 4 1/4 x 7 in.—Ideal Commutator Dresser Co., 1368 Park Ave., Sycamore, Ill.

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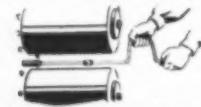
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walls, ties are 6 in. long overall with either 3- or 1 1/4-in. opposite right-angled anchor legs. Copperweld wire used in production of these ties has steel core protected against corrosion by thick welded-on covering of pure copper. It is said to combine in one material strength of steel and rust-resisting life of copper.—Copperweld Steel Co., Glassport, Pa.



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These six grades of steel vary greatly in strength. It is important to use the correct grade on any given job. With the Telfax tape you can check grade quickly and easily, even if identifying labels or tags have been lost or the rope respooled.

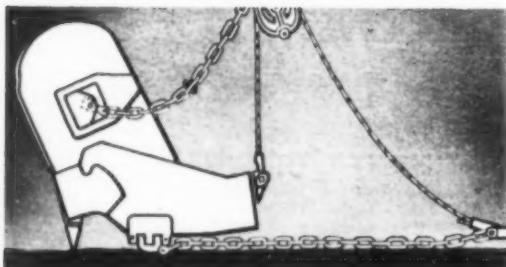
Play safe. Protect the lives of your workmen and the investment in your equipment by using Bethlehem wire rope, with the Telfax marker.

BETHLEHEM STEEL COMPANY

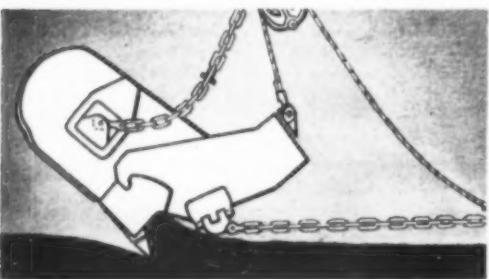




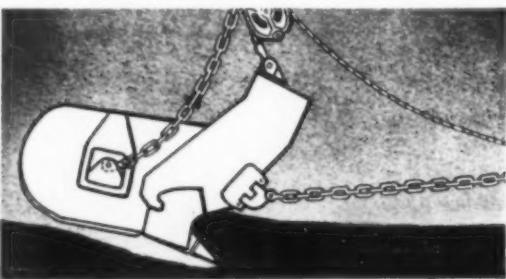
Here's What We Mean by **AUTOMATIC DIGGING ACTION**



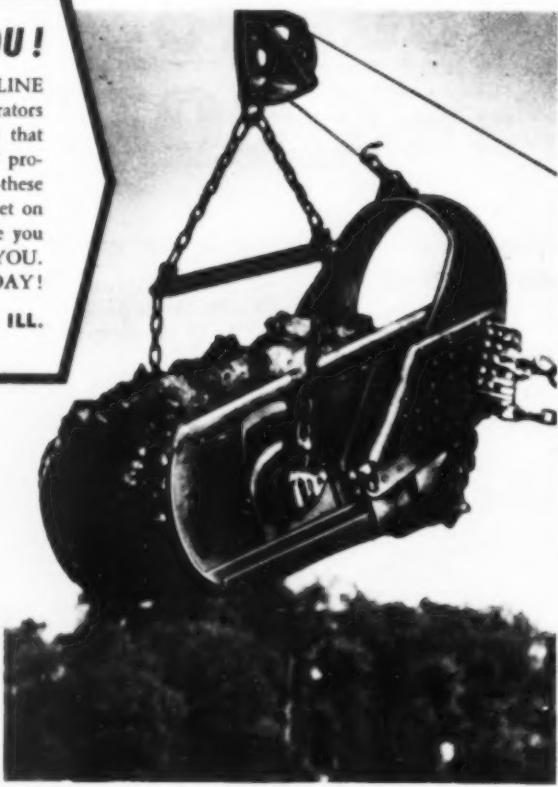
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LIGHTWEIGHT SOCKET & TOOL SET contains 40 pieces and includes 10 sockets with double hexagon openings from 5/16 to 7/8 in., 4 extra deep sockets with 5/8-, 11/16-, 13/16-, and 7/8-in. double hexagon openings; universal joint, 3-, 6-, 12- and 17-in. extensions; 17 1/2-in. speeder; drag link socket; 8 1/2-in.



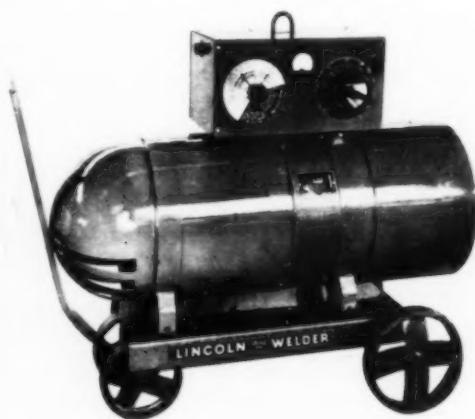
hinge handle; 6-in. cross handle; 7-in. reversible ratchet; 8-in. sliding "T"; 4 Bonaloy TuType (combination box and open end) wrenches with 7/16-, 1 1/2-, 9/16- and 5/8-in. openings; Channellock adjustable pump plier with 1/2- to 1 1/8-in. capacity; 4 assorted punches and chisels; pocket size screwdriver with neon tube; 4 wood handle screwdrivers of various sizes and 3/4-lb. ball pein hammer. All pieces are packed in strong, attractively finished metal box measuring 19x5x4 1/4 in. and equipped with removable tote tray, carrying handle and catches and padlock hasp. Weight, 20 1/2 lb.—**Bonney Forge & Tool Works, Allentown, Pa.**

★ ★ ★

ANTI-SABOTAGE FLOODLIGHT for use around munitions plants and other strategic industrial areas has weathertight unit which contains an aluminum reflector and fresnel lens to produce an intense beam covering approximately 10 deg. vertically and 18 deg. horizontally. Available for 300-watt standard clear lamps or for operation with street lighting lamps. Makes intruder clearly visible from patrol road at distance of 500 ft., while he faces impenetrable glare from all angles of approach.—**Revere Electric Mfg. Co., 2949 N. Paulina St., Chicago, Ill.**

★ ★ ★

DUAL CONTINUOUS CONTROL IMPROVEMENT for arc-welding machines in form of new welder control box is aid to prevent accidental contact with live parts, to increase accessibility, to permit wiring with flexible or rigid conduit or rubber-covered multiple-conductor cable and to eliminate dangers from unintentional loosening of lifting hook. Important feature: Separate compartment for all a.c. circuits, including push button, and for d.c. terminals. Com-



The "99-M" Gives You... MORE WORKING WEIGHT



Figured in terms of live tractive weight, THE "99-M" IS THE
HEAVIEST MOTOR GRADER ON THE MARKET

**TO HANDLE MORE JOBS
... MORE PROFITABLY**

● The "99-M" with its monorail frame enables you to breeze through jobs you wouldn't think of tackling with a conventional motor grader. This extra range of profitable usefulness is made possible by the "99-M's" extra *tractive weight* provided by its distinctive All-Wheel Drive.

With powerful traction on all four wheels, plus steerable rear wheels, the "99-M" enables you to keep going in bad weather and soil that formerly meant costly time losses. In addition to saving time and money on both normal and extra difficult motor grader jobs, it profitably handles the work of two, three or more "part time" pieces of equipment.

Wherever heavy snow is a Winter problem any available "99-M" is in demand. It's rear steer nullifies side thrust by the wing; while extra working weight provided by All-Wheel Drive makes the "99-M" far more effective in "bucking" heavy drifts.

Ask for a demonstration!

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois



A motor grader without power on the front wheels is like a draft horse with roller skates on his front feet.

Motor Graders • Loaders
Blade Graders
Elevating Graders
Hydraulic Scrapers
Crushing and Screening Plants

Cable Scrapers
Rollers • Roll-A-Planes
Motor Sweepers
Bituminous Distributors
Shovels and Cranes

Austin-Western



Laughlin drop forged Safety Clips grip wire rope with a real he-man's clench, not the rope-crimping "finger pinch" you get with ordinary U-Bolt Clips. Recent tests by one of the country's greatest engineering schools prove that Laughlin Safety Clips are over 50% more efficient!

Write for a free booklet which describes these amazing tests and shows how you profit in lower rope and clip costs by using Laughlin Safety Clips. It's free — use coupon. Mail it now.



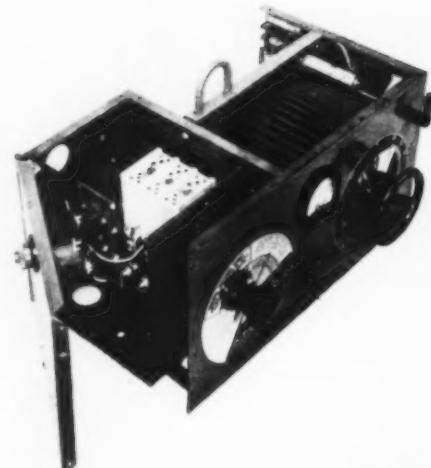
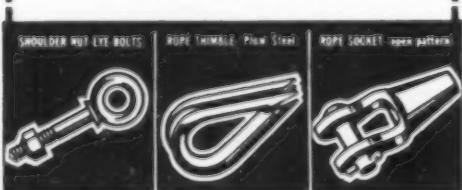
SAVE ROPE. When ordinary U-Bolt Clips are removed, bent and crimped rope must be cut off — wasting rope. When Laughlin Safety Clips are removed, rope is straight and strong, ready for use again — no waste of rope.

FEWER CLIPS NEEDED. Here's another big saving. You use only three Laughlin Safety Clips to get the same strength you get with four ordinary U-Bolt Clips.

**THE THOMAS LAUGHLIN CO.
Portland, Maine**

Please send me free Safety Clip booklet G-10
Name _____
Company _____
Address _____

Check here for catalog on items below
Look for Laughlin products in Thomas' Register
and buy through your distributor.

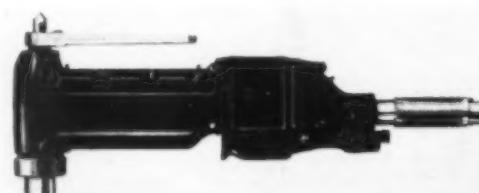


WY 2432

portments have snap catches which hold doors closed. Another feature: improved lifting hook made of round stock, shaped like a loop, arc welded to sub-panel of control box on one end and looped over cap screw on other so that all risk of hook being unscrewed unintentionally is eliminated. Control box is permanently grounded to motor and generator frames through mounting bolts to take care of inspection rules. Additional feature: new lead clamp said to prevent bending or damage to output studs when welder leads are accidentally jerked or pulled.—The Lincoln Electric Co., Cleveland, Ohio.

* * *

ROTARY PNEUMATIC CLOSE CORNER DRILL. capacity up to 2 in., reversible and non-reversible types, for use in railroad shops, shipbuilding yards and construction work is said to cut time, often to



one-half, for heavy-duty, close quarter work because of surplus power delivered by motor and because of sturdy construction of unit which reduces to a minimum hold-ups for repairs. Governor controlled, drill is claimed to be especially satisfactory in tapping operations. Lack of chatter results in cutting of clean, smooth, full strength threads.—Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.

* * *

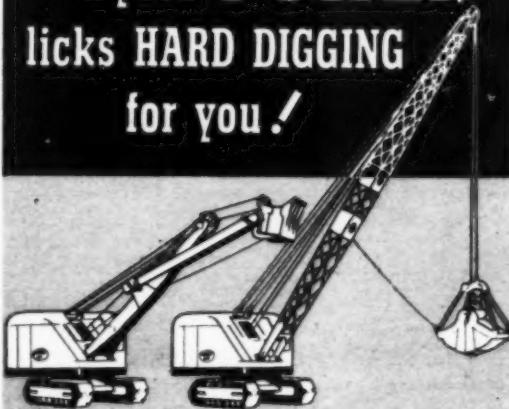
LIGHTWEIGHT ASBESTOS CEMENT PIPE is now available in 18-ft. lengths and in 6- and 8-in. sizes, eliminating 113 couplings per mile of line. Installation time saved said to speed up pipe laying and to cut costs.—Keasbey & Mattison Co., Ambler, Pa.

* * *

MINER'S LAMP has storage battery container made of Republic Enduro stainless steel, said to resist to great degree severe corrosive action and bumping and scraping which accompany underground work in mines, tunnels and sewers.—Thomas A. Edison, Inc., West Orange, N. J.



**Byers POWER
licks HARD DIGGING
for you!**



• It's power at the business end of a shovel that you need . . . cutting power that brings up a full dipper every time.

In any Byers, "direct drive" delivers maximum power direct to hoist, crowd and swing and to travel in and out where the going's tough.

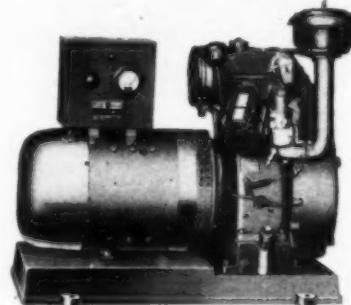
This is another reason why you should investigate Byers $\frac{3}{8}$ to $\frac{3}{4}$ yd. shovels.

**11 FULLY CONVERTIBLE MODELS
IN $\frac{3}{8}$ - $\frac{1}{2}$ - $\frac{5}{8}$ - $\frac{3}{4}$ YD. SIZES**

Modern CRANES and SHOVELS

BYERS

RAVENNA, OHIO



**BETTER
RESULTS
with
STERLING**



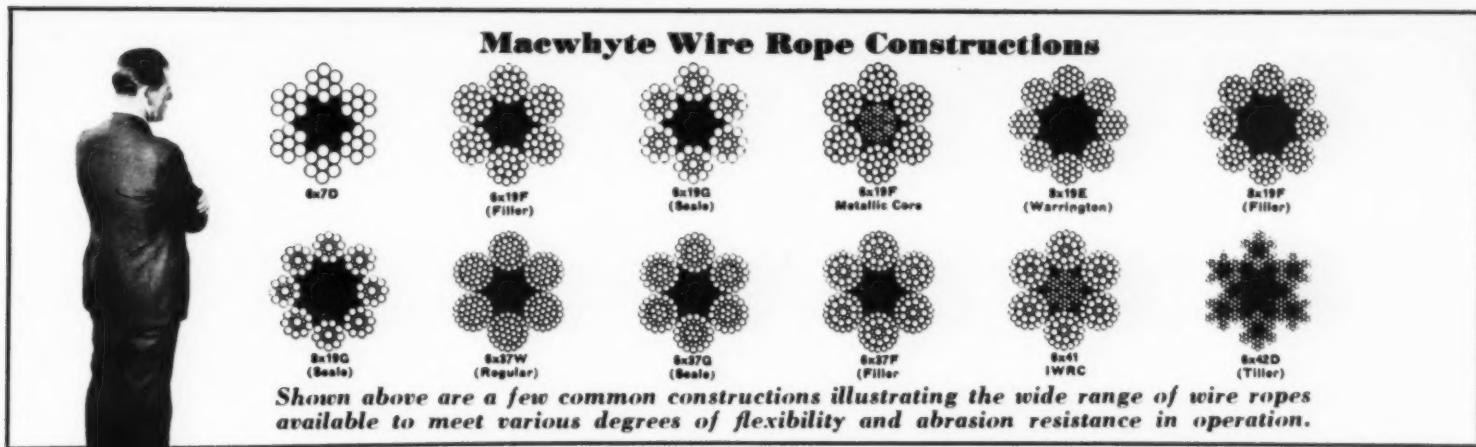
HOISTS - PUMPS - LIGHT PLANTS

There's a reason why the largest contractors select Sterling Hoists, Pumps and Lighting Plants for their most important jobs. Contractors everywhere have found they can do more work at less cost with Sterling Construction Equipment because Sterling's Fully Developed, Thoroughly Tried and Proven Design assures dependable performance.

Sterling Construction Equipment on your job means increased production and larger profits.

Write for literature and prices.

**STERLING MACHINERY CORPORATION
405-413 SOUTHWEST BOULEVARD
KANSAS CITY, MISSOURI**



Select The CORRECT Wire Rope For Your Equipment—Save Time and Money

(No. 8 in a series of informative articles for wire rope users prepared by the Macwhyte Wire Rope Company. Previous articles in this series are available on request on your company letterhead.)

Your wire ropes are subjected to . . .

- 1 Bending fatigue.
- 2 Abrasive wear.
- 3 Loading stress.

A Wire Rope is designed either to give most satisfactory service under any one of the above conditions . . . or any combination of them.

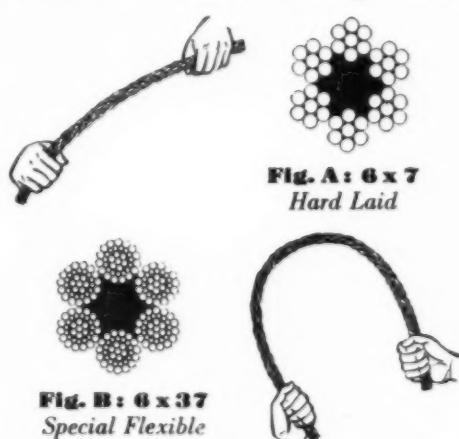
You must determine (or let Macwhyte engineers determine for you) the major factors affecting your ropes; then install the rope that will meet these factors to the best advantage.

Remember, wire ropes must have :

*Flexibility to meet bending fatigue.
Abrasion resistance to meet abrasive wear.
Strength to meet loading stresses.*

How to Determine Flexibility

Flexibility of a wire rope is determined by the number and size of its wires. Generally speaking, a rope with a small number of large wires is (See Fig. A) much less flexible than a rope with a



greater number of smaller wires (See Fig. B).

Between these two extremes are numerous wire rope constructions that vary the degree of flexibility. The flexibility

needed is determined by the smallest diameter sheave or drum on the equipment. Wire rope catalogs contain information regarding proper sheave diameters for various constructions of rope but it must be remembered that often flexibility must be sacrificed for abrasion resistance and a compromise is often necessary.

One of the reasons why Monarch Whyte Strand PREformed wire rope has become so popular is because the preforming of the rope increases its flexibility which is especially valuable where a compromise is necessary to get the best service.

How Abrasion Resistance Is Determined

The abrasion resistance of a wire rope is determined principally by the number and size of the outside wires in each strand in the wire rope. The wire rope, Figure A, for example, has high abrasion resistance. Notice that this rope has fewer but larger outside wires than rope Figure B. However, even though there might be an extreme abrasion condition of service that would normally require a rope having the best abrasion resisting characteristics, yet a compromise must often be made where sheaves are relatively small.

How Strength Is Determined

The strength of wire rope required for a specific piece of equipment depends a great deal upon the necessary safety factor of operation required.

A wire rope is never used up to its maximum strength. Many factors such as bending, and friction through sheaves and around drums, and also in some cases the weight of the rope itself adds considerably to the actual load that the rope is caused to sustain.

Therefore, each type of operation usually has a specific safety factor which must be considered before it can be determined whether or not a specific rope is strong enough for the job. (Copies of previous articles in this series discussing safety factors are available on request.)

What to Do

There have been many installations where the proper application of wire rope has doubled the service with a consequent double saving in wire rope dollars. Keep service records on the basis of tons of material handled, car miles traveled, ton miles, etc., rather than hours and days of service to see how the specific wire rope you are using likes its work.

Consult with Macwhyte Company or any one of its many distributors on any question pertaining to wire rope, its application, and the service you are getting.

There are hundreds of installations like yours on which Macwhyte wire rope engineers have had experience. They can save you the trial and error method of determining the best rope for your use.

The new Macwhyte general wire rope catalog G-14 contains over 60 pages of helpful information that will save you money. Write for a copy on your company letterhead.

NO. 574

MONARCH
Whyte Strand
PRE-FORMED

... the CORRECT rope for
your equipment

MACWHYTE COMPANY
2941 Fourteenth Avenue • Kenosha, Wis.

Manufacturers of Wire Rope to meet every need—
left-&-right lay braided slings—stainless steel wire rope—
monel metal wire rope—aircraft cable, aircraft tie rods,
Safe-Lock cable terminals.

New York • Pittsburgh • Chicago • Fort Worth
Portland • Seattle • San Francisco
Distributors throughout the U. S. A.

GREATER SPEED and UTILITY



All Equipped with DIAMOND ROLLER CHAIN DRIVES

Most of the machines which make jobs like Grand Coulee, Boulder, Shasta and Pennsylvania Turnpike seem simple and easy and do the routine construction jobs faster, better and at lower costs, are equipped with DIAMOND Roller Chain Drives.

They meet a wide variety of speed and power requirements—short pitch multiple strand chains to transfer the power from the heavy duty engines turning at high speeds,—larger chains for the low and medium speed intermediate drives, to crawlers, to wheels, to transmissions, to conveyor shafts—and the heavy rugged high strength chains to the "crowd" on shovels.

Experienced construction firms recognize the importance of DIAMOND Roller Chains on their new equipment and for all replacements. DIAMOND CHAIN & MFG. CO., 418 Kentucky Ave., Indianapolis, Ind.

DIAMOND ROLLER CHAINS

... If you want to make speed profitably ... GET DEPENDABLE EQUIPMENT ... Buy the Fast ...

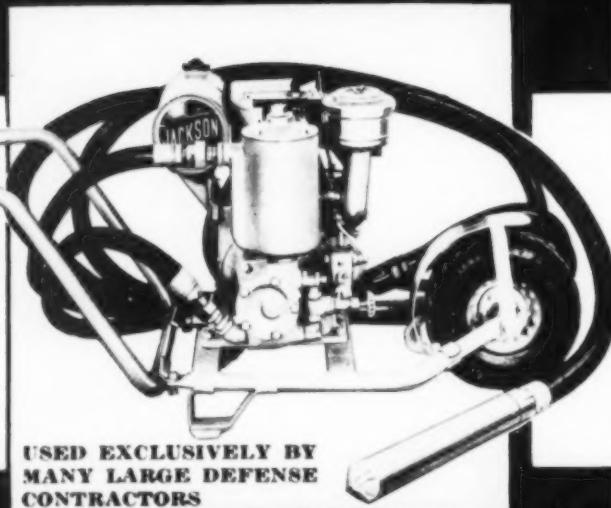
JACKSON Hydraulic Concrete Vibrator

DESIGNED TO "TAKE IT" 3 SHIFTS A DAY—EVERY DAY

Automatic pressure lubrication—requires no attention. 34-ft. hose— $2\frac{3}{4}$ " vibrator head.

Adjustable frequency to 6800 R.P.M.—submerged in concrete. Powerful gas engine—4.7 H.P.

Long lived, ball-bearing, rotary, hydraulic pump. (Used exclusively by many large defense contractors).

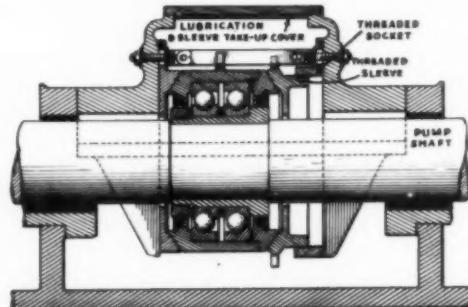


USED EXCLUSIVELY BY MANY LARGE DEFENSE CONTRACTORS

ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON, MICHIGAN

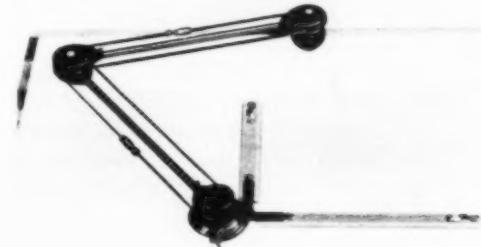
BEARING UNIT has been developed to simplify adjustment and alignment of bearings in larger size dredging pumps. Aligning feature provided by spherical surfaces on outer cartridge faces and adjustment is provided by threaded sleeve and socket



arrangement. Sleeve is readily accessible through opening with hinged cover and is turned to tighten or loosen it with spanner wrench or screw driver. Unit is lubricated separately from sleeves and is said not to be subject to contamination from oil which might come through sleeve bearings.—American Manganese Steel Div., The American Brake Shoe & Foundry Co., Chicago Heights, Ill.

* * *

"TRUE LINE" DRAFTING MACHINE, comprising protractor, vernier, T-square, scales and triangles, is said to be conveniently operated and to eliminate smudging and blurring caused by moving instruments over drawing. Equipped with "Quick Flick" controls which release scales for 15-deg. automatic



stops or for intermediate stops and locking. Scale may also be set at any angle with protractor and vernier reading of zero to zero. Design permits use of instrument with elbow to left or right. Protractor may be used at any angle in complete circle so that total area of board is made accessible. All parts subject to wear are made of hardened steel, and index plate is notched to take up any wear automatically.—Frederick Post Co., Hamlin & Avondale Aves., Chicago, Ill.

* * *

TOGGLE-TYPE BARREL DUMPING HARNESS, is said to speed up and increase efficiency of handling of barrels and drums. Drum is placed in harness by Lewis-Shepard barrel hoop truck, elim-



inating necessity of setting it on floor first. Harness is equipped with spring toggle, is arc-welded throughout and may be had for any size drum—Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.



Buckets of Profit with **RED ARCH**

A RED ARCH dragline bucket equipped with the new RED ARCH drag chain is a combination hard to beat. Faster digging, longer service, lower costs and surer profits are points every dragline owner is interested in . . . that is why every dragline owner will be interested in RED ARCH buckets.

Try a RED ARCH bucket and convince yourself that the streamlined construction eliminates excess weight; gives better balance for bigger loads; is faster dumping; has greater strength and durability —to save you money in every way.

A quicker fill . . . a smoother carry . . . a cleaner dump: these are performance features which place RED ARCH buckets in high favor with owners and operators alike. Because of their lighter weight, they often permit operators to use larger buckets on their present machine, thus moving more dirt per cycle!

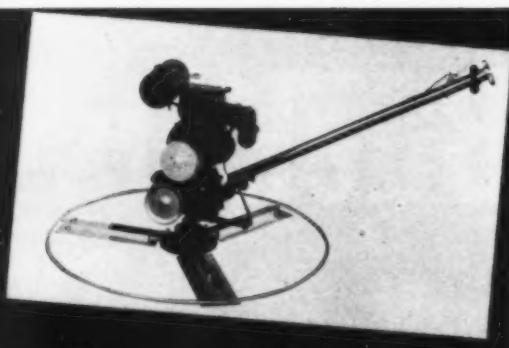
Investigate RED ARCH yourself . . . soon. It pays . . .

Bucyrus-Erie
SOUTH MILWAUKEE, WISCONSIN

**Unfinished Pour
Drenched by Rain**

SAVED by

WHITEMAN Machine Finisher



Under the worst conditions for cement floor finishing — a boiling sun — rain on an unsheltered pour — the Whiteman Machine Finisher has proved itself unequalled for cement floor finishing.

In the new Southern California aircraft plants, Whiteman machines finished acres of new cement floors. Commenting on the performance of the machines, the General Superintendent of one construction company had this to say:

"On several occasions, we spread quite an area of flat work and had already started finishing when it began to rain, making it necessary for us to shut down the job. A few hours after the rain stopped, we dusted on some cement and sand and started the Floats (Whiteman Cement Floor Finishers). In every case, we brought the finish up and obtained a real good finished surface. In my opinion, it would have been impossible to have saved the floors and get the results we did without the aid of these Floats (Whiteman Cement Floor Finishers)."

You can cover 1,000 sq.ft. of concrete in as little as 15 minutes with this PROVED machine finisher. Its rotating, adjustable pitch, steel trowels produce flatter smoother floors in less than half the time — at lower cost. The Whiteman Finisher eliminates unnecessary costly overtime.

The Whiteman Finisher gives you a stronger, denser, more wear-resistant cement floor — a surface without laitance or voids caused by water or air particles. The coarse aggregate is uniformly distributed right up to the wearing surface.

Now being used on construction projects everywhere. See it in action! Write today for the name of your nearest dealer.

WHITEMAN

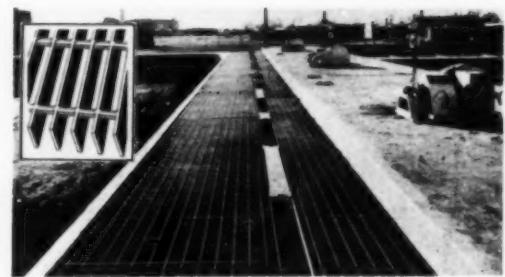
MANUFACTURING COMPANY
3244 Casitas Avenue
Los Angeles, California

Denser, More Level Floors Without Dry Topping



"WHITEMAN" Hand Grill TAMPER

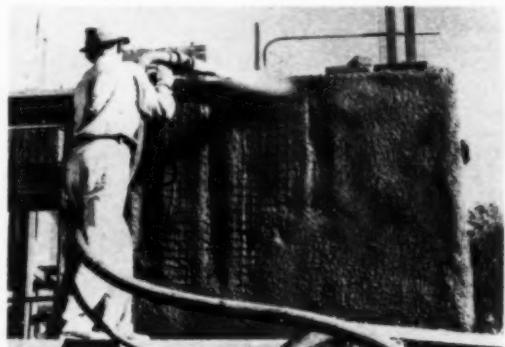
You get a denser floor with more even distribution of finer aggregates on the surface, when you prepare the slab with this Grill Tamper. With a good concrete mix, dry topping is unnecessary. The "Whiteman" Tamper knocks heavier aggregates down — leaves a "fat" sufficient for finish. This inexpensive lightweight, collapsible and adjustable Tamper saves time and money on all types of surfaces. Write today for full information.



WELDED STEEL GRATING, for passage ways and platforms inside or outside or between buildings, for ramps, stair treads and covering for flow-ways, is made of hot rolled hexagonal steel bars placed at right angles on top of flat bearing bars set on edge and electro-welded under great pressure. Cross-rods, sunk flush and welded into bearing bars, make rectangular mesh which is self-cleaning and also provides non-slip surface. Made with main bars on 1 3/16-in. centers, in panels 24 in. wide and lengths to 35 ft.—Wm. F. Klemp Co., 6611 South Melvina Ave., Chicago, Ill.

★ ★ ★

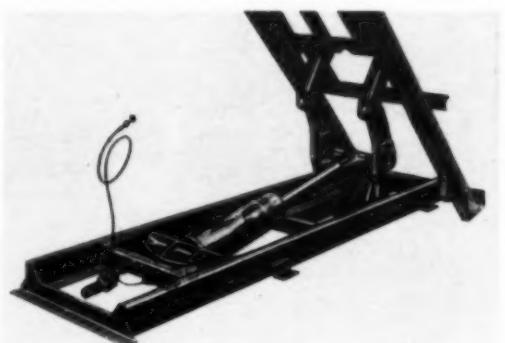
PNEUMATIC CONCRETE GUN for placing high test concrete by compressed air is known as "Westberg Cement Pressure Gun" and operates automatically on rotary valve principle that conveys pre-mixed dry materials into high pressure stream of air passing through gun. Compressed air enters gun through



screw operating in air chamber below rotor valve and through air dome placed between screw and rotor valve. Materials are fed into gun by hand shoveling or by conveyor synchronized with speed of rotor valve. Pre-mixed materials are thus conveyed pneumatically out of gun through rubberlined hose to nozzle, and then blown into position on surface. Water is introduced into nozzle at 100-lb. pressure which hydrates dry materials causing them to remain in position and develop full strength of cement. Concrete placed with this gun develops compressive strengths of 4,000 to 6,000 lb. per square inch, determined by proportion of cement used. Gun will deliver as much as 10 cu.yd. of material per hour.—The Cosco Mig. Co., 832 E. 60th St., Los Angeles, Calif.

★ ★ ★

HYDRAULIC HOIST DUMP BODIES, capacities 5 to 30 tons, will now be equipped with double-arm Super Hoists and with latest "Push-Pull" dash control. Hoist design permits exclusive use of rubber



restraining blocks to replace chains and springs. Other features of Super-Hoist design: telescopic tipping and subframe for lower mounting and greater load and truck stability; unit construction which makes entire dump body independent of truck chassis and uses chassis for carrying load only.—Anthony Co., Streator, Ill.

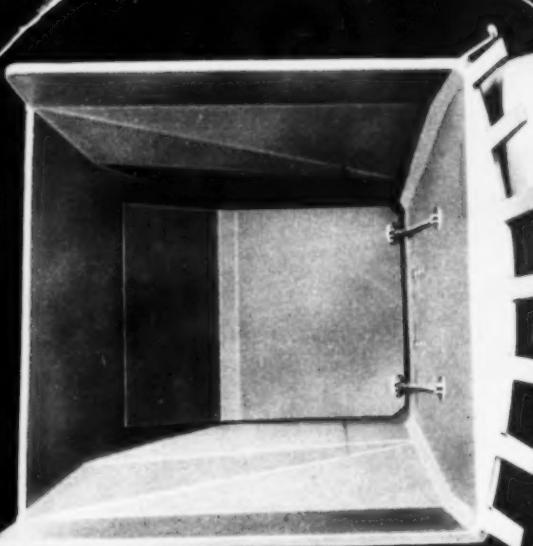


*Easy Spotting
Big Body...
FOR HIGH SPEED LOADING*

FAST...EASY-LOADING... MORE YARDS PER HOUR

More loads per hour means more yardage per shift . . . and production is what counts today! And that is why the KOEHRING DUMPTOR can help you on those tough schedule jobs. Short wheelbase and full forward operator vision makes it easy to maneuver in tight spots, close to the shovel. That cuts shovel swing time for more passes of the dipper per hour. Wide body top opening makes it easy to spot the dipper load. That saves more time. And then the full speed reverse gets the Dumptor away from the shovel without delay . . . speeding on its way to the fill. Seconds are saved with every move . . . you get more loads per hour with the KOEHRING DUMPTORS!

KOEHRING COMPANY • Milwaukee, Wis.

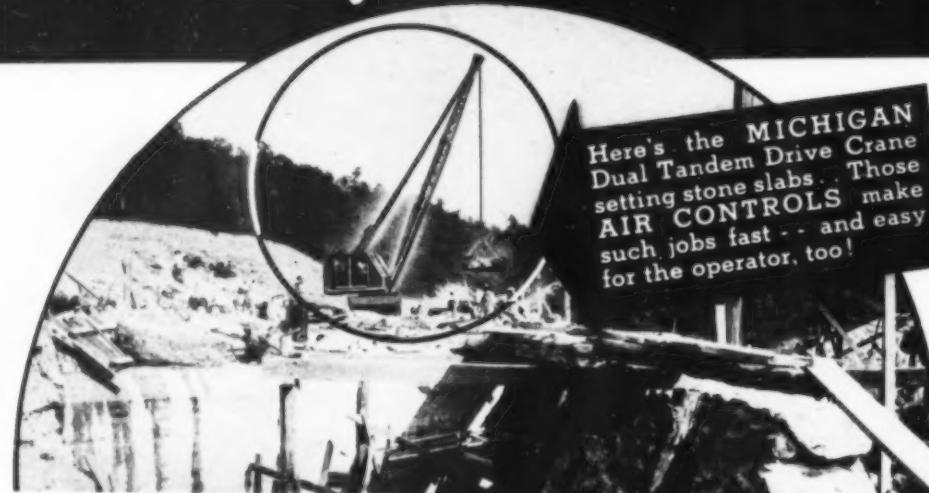


Wide body top opening permits instantaneous dumping from the shovel dipper, for more loads per hour . . . more yardage per shift . . . lower hauling costs with the KOEHRING DUMPTOR.



HEAVY-DUTY CONSTRUCTION EQUIPMENT

A CRANE -- WHERE *you want it* - AND WHEN!



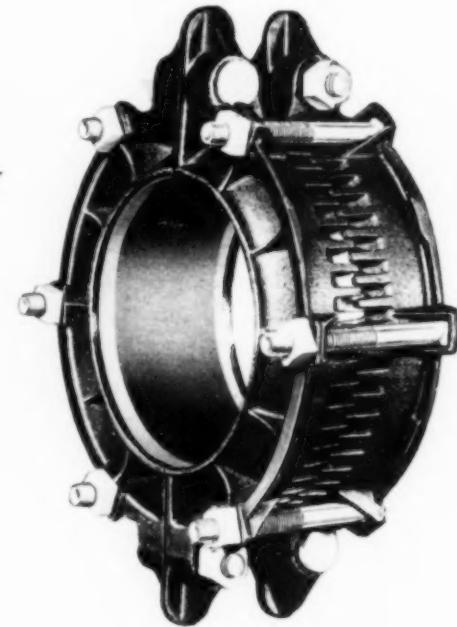
This Rugged, Rubber-Tired Crane-Shovel
REALLY GOES PLACES — FAST

If it's action you want on your jobs — especially those scattered ones — "Mobilize" with Convertible Michigan Tandem-Drive Shovel-Cranes — Don't compromise speed and ability — get BOTH — and at reasonable cost. Write TODAY for Bulletin CM-19 and name of nearest dealer. MICHIGAN POWER SHOVEL COMPANY, BENTON HARBOR, MICH.



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AIR-CONTROLLED
SHOVELS - CRANES - CLAMS DRAGLINES - TRENCH HOES

SPLIT COUPLING CLAMP, for repairing broken cast-iron mains, consists of two sturdy malleable iron intermeshing compression rings, halved, Monel metal sealed band, heavy triangular shaped gasket, break-covering brass band and electro-plated high tensile steel bolts. Molded gasket is $5\frac{1}{4}$ in. wide.



of very soft gum and carbon black with hard, vulcanized tips at outer edges. As intermeshing compression rings are drawn together by bolts, finger projections intermesh and gasket is uniformly compressed. Clamp is tested to 800-lb. line pressure and is self-adjusting to various classes of cast-iron pipe. Said to take care of any break not more than 2 in. out of "square-across." May be installed in 15 min. and is claimed not only to splice break but to insure against recurrence of trouble by introducing degree of flexibility in line at point repaired. May be used to repair pin-hole leaks or splits in cast-iron brazed joints or to replace without disturbing line, mechanical couplings which are leaking. Although no rubber compound is immune to solvents, sealed rubber excludes them.—M. B. Skinner Co., South Bend, Ind.

* * *

ARC WELDER RULE, said to save time in estimating electrode requirements, operates similar to slide rule. It reads directly length of arc-welded joints obtainable per 10 lb. of electrode and pounds of



weld metal deposited per 100 lb. of electrode. Information covers 11 different commonly used sizes and types of joints and 22 different sizes and types of popular electrodes in both 14- and 18-in. lengths. Feature: selector chart which shows various filler metal classifications as specified by American Welding Society and types of electrodes which meet these classifications.—General Electric Co., Schenectady, N. Y.



THE new Shell Rudis Oil is tough. It's been tested in the laboratory, in test engines and in the field, under the most severe operating conditions. It has met every test, with flying colors!

These exhaustive tests, made by competent, independent engine authorities,

prove that the new Shell Rudis Oil . . .

- 1—Has high oxidation stability under the most severe temperature conditions.
- 2—Keeps rings and pistons free.
- 3—Is non-corrosive to bearing metals.
- 4—Reduces sludge formation.
- 5—Cuts down engine wear.

Test Shell Rudis Oil yourself—and save!

NEW SHELL RUDIS OIL FOR HEAVY DUTY

It's GOT what it TAKES

Brute ability that comes from putting weight where it does the most good — alloy steels where their wear resistance counts — good engineering where skimping would cut shop costs but shorten bucket life. A Haiss Bucket is tops, today — on performance. . . . Ask any contractor.

HAISS Hi-Power . . . FOR PAY LOAD CLAMSHELL DIGGING

All sizes available. Wire or write for prices. Descriptive Bulletins on request.

In stock at New York, Hartford, Philadelphia, Charlotte, Richmond, Baltimore, Atlanta, Birmingham & Los Angeles
GEORGE HAISS MFG. CO., INC., 139th ST. & CANAL PLACE, NEW YORK — DISTRIBUTORS EVERYWHERE



Excavation for Exploratory Caisson—Neversink, N. Y.

How's This For Speed?

In forty-five days, Geo. M. Brewster and Son of Bogota, N. J., excavated an exploration caisson pit, fifty-five feet deep, for Neversink Dam at Neversink, New York.

A Moretrench Wellpoint System, installed in three successive stages, controlled fifty feet of water, giving the contractor the many advantages of working IN THE DRY.

You can handle your wet work just as easily

and economically. Get a Moretrench Wellpoint System on the job!

MORETRENCH CORPORATION
90 WEST STREET • NEW YORK
Rockaway, N. J. Joliet, Ill. New Orleans, La.

EARTH MOVER PNEUMATIC TRUCK TIRE, called Universal Super Traction, for service in construction of airports, military reservations, highways and other large projects, features non-directional tread designed to give two-way traction, forward and backward, and minimum of side slippage in service on



hillsides and in ditches. New tread is composed of series of V-shaped wedges that are self-cleaning and (according to makers) will not clog in soft or muddy going, making tire especially suited for use on logging trucks in lumber camps where off-the-road traction and slow, even thread wear are required. Another advantage: heavy thickness of rubber on sidewalls to protect tire against chafing and cutting. Photo shows Koehring Dumper equipped with Universal Super Traction Silvertowns at work on Skyline Drive, near Natural Bridge, Va.—The B. F. Goodrich Co., Akron, Ohio.

* * *

LIGHTWEIGHT AIR-OPERATED IMPACT WRENCH weighs 4 lb., is reversible and can handle up to and including $\frac{3}{8}$ -in. bolt size nuts. Designed with Pott impact wrench principle which localizes steel



to steel impact without transmitting shock to other parts of tool. Form-fitting pistol grip handle, short overall length and small nose diameter permits operation in close places. Average working speed at 90-lb. pressure, 1,050 r.p.m. Weight 4 lb.—Ingersoll-Rand Co., Phillipsburg, N. J.

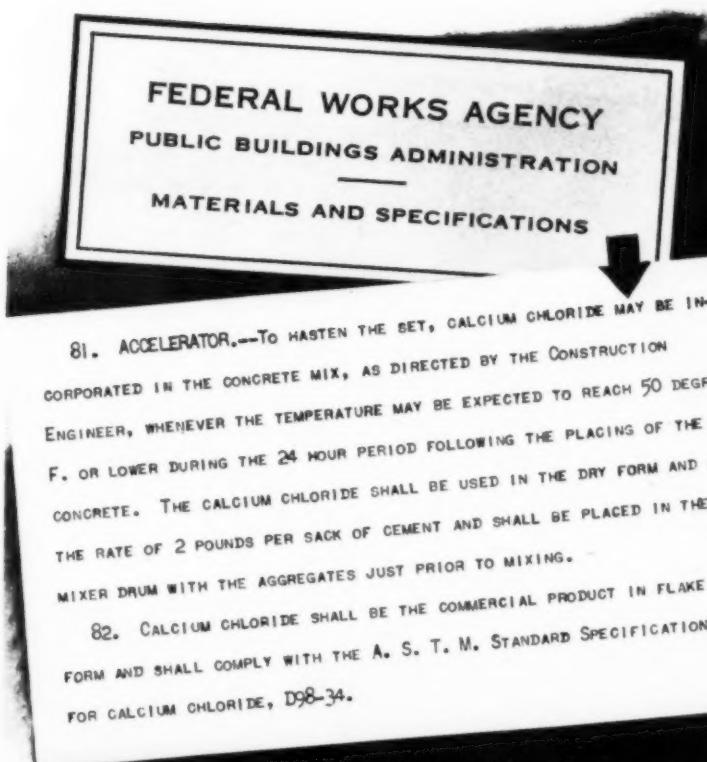
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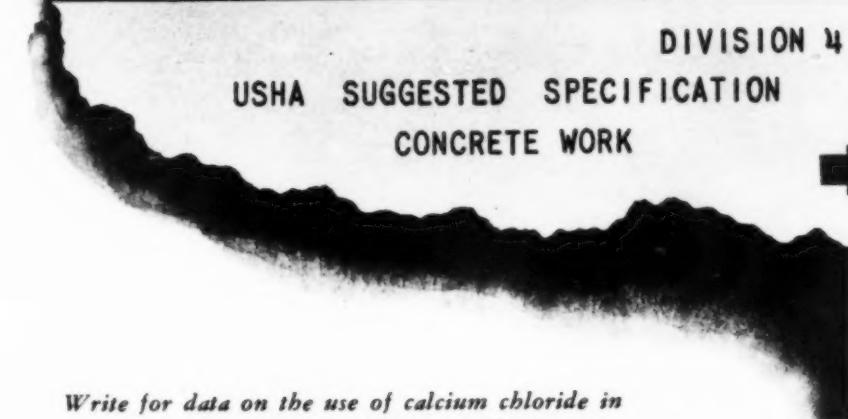
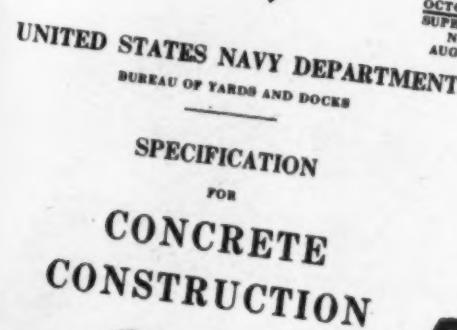
FOR LOADING SAND from side of road into trucks, A. S. Hubbs of San Bernardino, Calif., uses this Athey MobiLoader combined with Caterpillar diesel tractor. Outfit shown here working on state highway near Etiwanda, Calif., put in 8 hr. per day and was able to fill 1½-yd. trucks with one bucket load.—Caterpillar Tractor Co., Peoria, Ill.

SPEED COLD WEATHER CONCRETING

Calcium chloride is used in many government projects as well as in private construction to accelerate the set and secure high early strength for cold weather concrete. The National Bureau of Standards reports that "Integral use of calcium chloride is effective in accelerating the curing of all cements" and "all concretes with calcium chloride have greater strength than plain concrete at all ages tested."



When the atmospheric temperature is 50° F. or less, the contractor may use not to exceed 2 pounds of calcium chloride per sack of cement as an accelerator, if approved. No extra payment will be made for the calcium chloride so used; it shall be applied in the mixer drum in the form of a solution consisting of 4 pounds of calcium chloride to each gallon of water. The water in the calcium chloride solution shall be included in the water-cement ratio of the concrete mixture. All other requirements given hereinbefore shall apply when calcium chloride is used.



(2) Whenever the temperature of the surrounding air is below 40° F. all concrete and cement finish shall be placed and maintained after depositing at temperature above 70° F. for not less than 72 hours, or above 50° F. for not less than 120 hours when portland cement is used and above 70° F. for not less than 48 hours or above 50° F. for not less than 72 hours when high early strength cement is used. Maintained temperature periods may be reduced 1/3, if, not less than 1-1/2 nor more than, 2 quarts of a solution containing 1 pound calcium chloride crystals per quart, is incorporated in the concrete mix for each sack of cement, as part of the total mixing water.

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NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

DIESEL LUBRICATING OIL—Kendall Refining Co., Bradford, Pa. (19 pp., illustrated) Refined Pennsylvania crude oil of premium quality is fortified by addition of special inhibitor to prevent bearing corrosion, sludge formation and oil deterioration. Additive also produces mild detergent action by causing solids to be held in suspension in oil instead of depositing in engine. Results of engine tests are given, with charts and photographs showing behavior of oil throughout run. This diesel oil is also recommended for heavy-duty gasoline engine service.

★ ★ ★

WELDER'S ELECTRODE ESTIMATOR—General Electric Co., Schenectady, N. Y. (Slide rule, pocket size.) Arc Welderule operated like slide rule gives lengths of welded joints obtainable and pounds of weld metal deposited per 100 lb. of electrode for eleven common sizes and types of joints made with 22 different sizes and types of electrodes in 14- and 18-in. lengths. Selector chart on rule shows various filler metal classifications specified by American Welding Society and types of electrodes meeting these classifications.

★ ★ ★

GOOSENECK TRAILERS—Rogers Bros. Corp., Albion, Pa. (28 pp., illustrated.) Wide variety of trailers for heavy-duty and unusual hauling. Designs offer low heights of decks and rear bridges for easy loading and maximum headroom clearance. Trailers are equipped with dependable brakes. Dollies are of transverse girder construction and are mounted on springs. Steel plates of goosenecks are electrically welded. Detachable fifth wheels on semi-trailers. Rocking axles compensate for crown or irregularities of roadway. Trailer types include both level and drop decks. Carrying capacities from 5 to 75 tons. Rear end of 60-ton trailer has four rocking axles and 16 pneumatic tires.



★ ★ ★

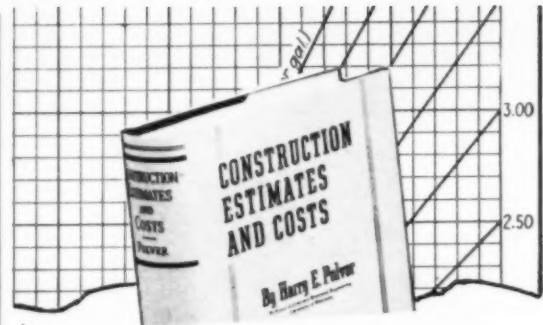
NEW HEAVY-DUTY OIL—Quaker State Refining Corp., Oil City, Pa. (7 pp., illustrated) Describes new stabilized heavy-duty lubricating oil for service in motor trucks, tractors and other equipment powered by both gasoline or diesel engines. To refined high-quality Pennsylvania mineral oil are added chemical agents to prevent oxidation and corrosion and to function as a detergent or cleanser to eliminate fouling of metal parts of motor by deposits of carbon. Product results in an "alloyed" oil. Data on test runs of engines using oil with and without additives.

★ ★ ★

AIRPORT DRAINAGE—Armco Drainage Products Association, Middletown, Ohio (4 pp., illustrated) Pamphlet entitled "After All, Planes Must Land" offers suggestions on use of perforated, corrugated metal pipe for airport subdrainage to assure firm, dry field and quick runoff of surface water.

★ ★ ★

GAS CUTTING MACHINES—Air Reduction, New York, N. Y. (26 pp., illustrated) Bulletin contains descriptions of motor-driven gas cutting machines—some portable and some stationary—for marine construction. Specially designed machines cut straight lines, arcs, circles, templets and unlimited variety of shapes from steel plates, slabs, billets and forgings.



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Estimating in General Handling and Transporting Materials	Lathing and Plastering
Excavation	Heating and Air Conditioning
Piling and Bracing	Plumbing
Concrete	Electrical Work
Masonry	Painting, Papering, and Glazing
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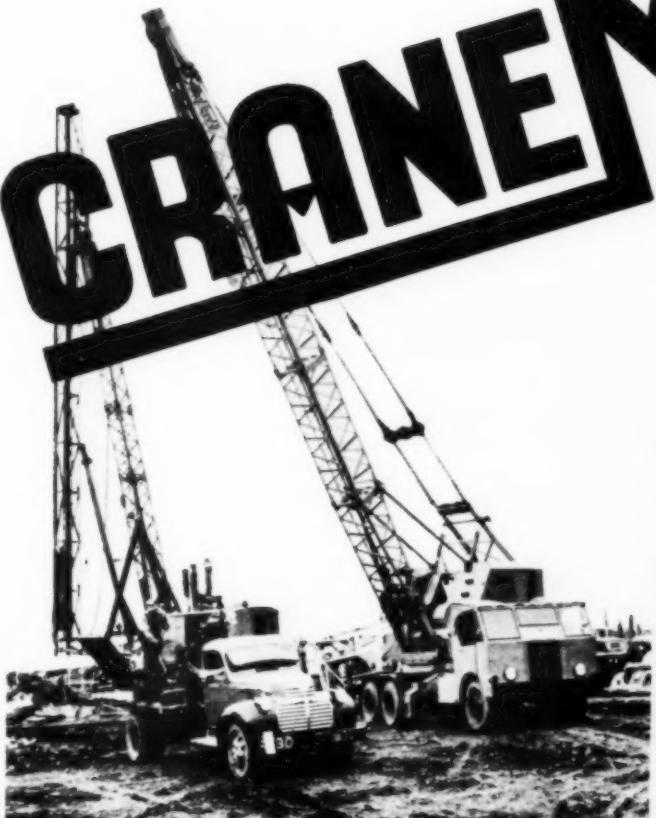
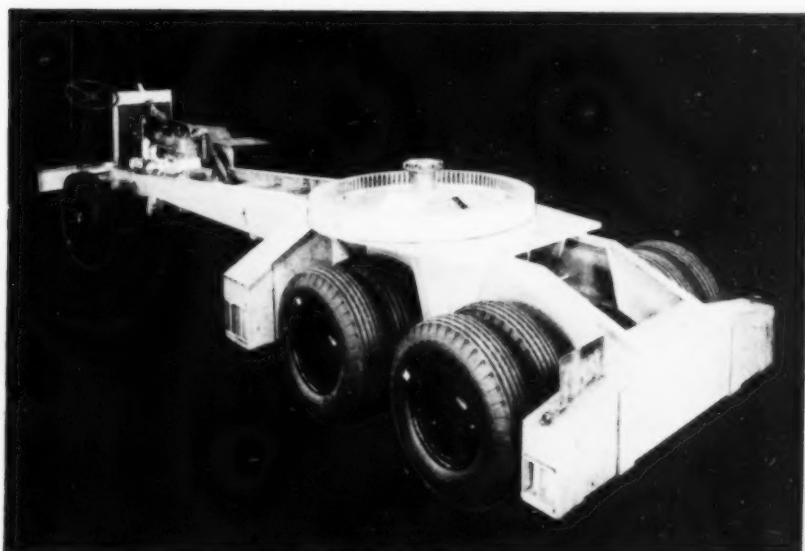


Photo above shows an 18S CraneMobile (20 ton crane) working for Booth and Flinn Company at the Bethlehem-Fairfield Shipyard on the Patapsco River near Baltimore, Md., where 16 shipways are being built at the rate of one every two weeks.



Stepped up construction activities from the Atlantic to the Pacific outposts demand the speed, mobility and flexibility of the BAY CITY CraneMobile, a self-contained crane unit mounted on a specially designed carrier equipped with 10 heavy-duty pneumatic tires. With variable travel speeds up to 35 miles per hour, the CraneMobile will cut time on the job or in transit. And, there is no sacrifice of dependable BAY CITY performance. The crane machinery has the same high power, nice balance and sturdy design that has won such a wide reputation in the crawler crane field. The CraneMobile is made in five sizes with ratings of from 5 to 20 tons. It is the modern answer to today's requirements for speed and profit on heavy lifts or high lifts, big or little scattered jobs anywhere. We would welcome an opportunity to show you how a BAY CITY CraneMobile will fit into your JOB PICTURE.

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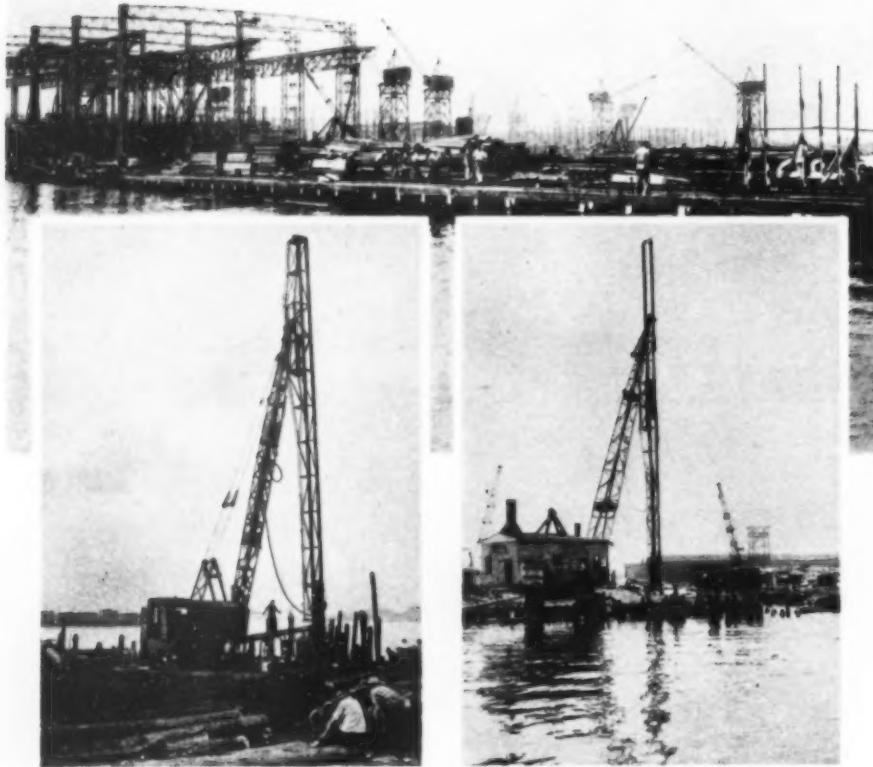


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In constructing the 16 shipways on the Patapsco River at Baltimore it was necessary to drive 45,000 untreated timber piles, 25 to 120 ft. long. Five Vulcan No. 1 Hammers and four Vulcan No. 2 Hammers were used.

Each of the Vulcan No. 1, 5000 lb. single-acting pile hammers drove 65 to 70 piles per shift (8-hrs.).

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HANGAR CONSTRUCTION — **Timber Engineering Co.**, Washington, D. C. (28 pp., illustrated) Sixth edition of Airplane Hangar Construction, published by National Lumber Manufacturers Association, discusses selection of airport sites and Civil Aeronautics Authority requirements for hangar construction and includes plans of timber hangars by Airport Section, Bureau of Federal Airways, CAA.

* * *

ROAD DRAINAGE — **Armco Drainage Products Association**, Middletown, Ohio. (8 pp., illustrated) Booklet describes method of intercepting and removing groundwater by installation of perforated pipe drains to eliminate common cause of surface failures in highways.

* * *

PORTABLE TRANSFER LOADER — **The Jaeger Machine Co.**, Columbus, Ohio. (2 pp., illustrated) Bulletin furnishes information on use of portable transfer loader for charging truck mixers from batch trucks on paving work to save mixer haul from batching plant.

* * *

CONCRETE SPREADER-VIBRATOR — **Blaw-Knox Co.**, Blaw-Knox Division, Pittsburgh, Pa. (12 pp., illustrated) Bulletin No. 1803 shows use of new spreader-vibrator machine on concrete paving construction and describes results.

Demountable Sectional Houses PREBUILT IN CENTRAL YARD

(Continued from page 64)

ticularly when the construction method itself was quite radical. The same situation likely would be faced by private builders who might wish to utilize demountable construction in commercial operations.

To meet the need for a roof of acceptable design, a type of roof construction was developed which allows the two sides of the roof on each sectional unit to be laid down more or less flat on the ceiling joists. The projecting eaves move as a unit with the roof in this operation. After delivery, the roof panels are lifted up again. An ingenious hinging device allows both lowering and raising to be performed with ease. The photographs and drawings illustrate this feature.

Choice of Materials — Most of the materials used in the houses are entirely conventional. Exterior sheathing, however, is Homasote wallboard which was selected because it combines a good deal of structural rigidity with considerable insulating value and permanence. It is light in weight and comes in large sheets which reduce the number of joints to a minimum. When painted, as on this project, it is expected to last in excess of 25 years in the judg-

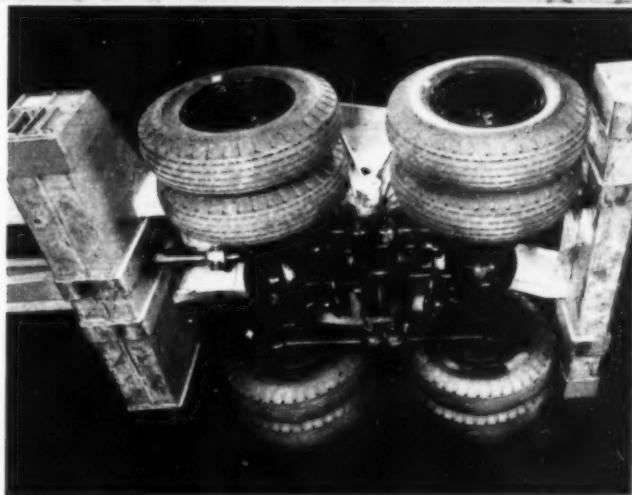
(Continued on page 88)

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Investigate the new husky, speedy cranes with **TIMKEN "6-WHEELERS"**!

From the Mesabi Range to the hills of Mexico, there are thousands of jobs that call for mobile cranes, like the Cranemobile shown above, made by Bay City Shovels, Inc. These sturdy cranes (and shovels, too) move from job to job under their own power with amazing ease and in a minimum of time. They cut hours, sometimes days, off of jobs and increase profits at the same time. They are invaluable in the construction industry. Timken Front Axles and Timken 6-Wheel Tandem Drive Axle Units are a vital part



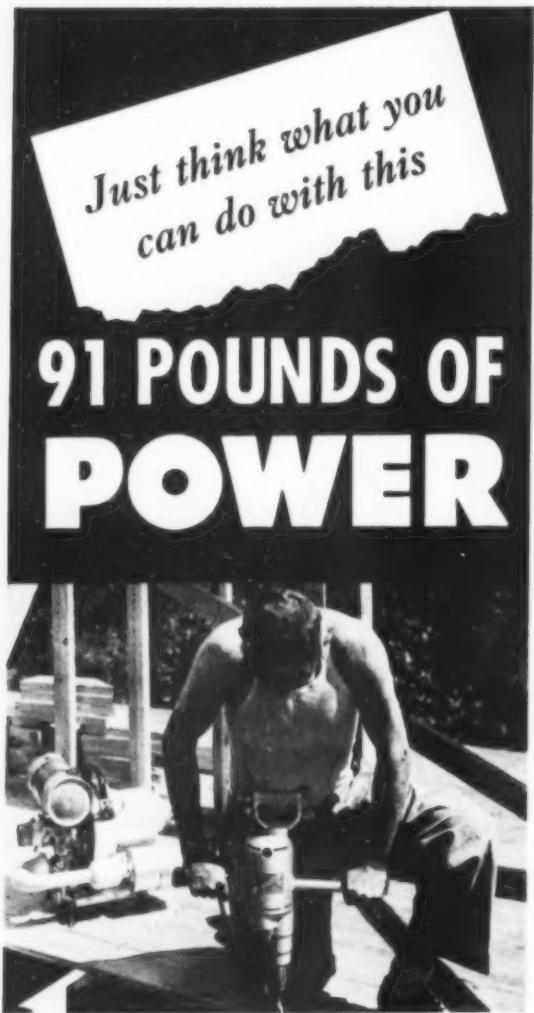
of this new and important development. They are The Accepted Standard with manufacturers—a sure guide to quality when you buy a mobile crane or shovel.

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THE TIMKEN-DETROIT AXLE CO., DETROIT, MICHIGAN

• WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN

October 1941—CONSTRUCTION METHODS—Page 87



OPERATE ELECTRIC TOOLS

For an electric generator that weighs only 83 pounds—complete with its built-in gasoline engine—a Homelite can certainly do plenty for you. Its 1800 watt output is enough to push electric hand tools, saws, drills, vibrators and many others—right up to their productive limits. It gives you electric power where you want it and when you want it. It's easily portable—can be set up anywhere. No long cables are necessary and it's always ready for work—hard work.



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On night work, you can use your Homelite for operating brilliant floodlights—in addition to operating electric tools. You can give your men the bright illumination they need for efficient work. A Homelite will run several brilliant floodlamps—lights that you can set up at several spots—and the automatically held 110 voltage of the Homelite insures steady flickerless flood lighting regardless of load.

Send for bulletin.



HOMELITE
CORPORATION
1810 Riverside Ave., Port Chester, N.Y.

(Continued from page 86)

ment of the Federal Housing Administration and other competent agencies.

Strip shingles were chosen for the roof because they are a satisfactory low-priced material and because they lend themselves to jointing between units. In place of foundation walls, Flexboard was used. This substitution was made primarily to effect a cost saving over masonry foundations while retaining the same general appearance. Flexboard is an asbestos-cement product, not subject to rot and sufficiently flexible to survive the vicissitudes to which it will be exposed without cracking. It projects about 3 in. into the ground and thereby seals the underside of the first floor against drafts. The material had been used for the purpose on previous projects and had been found satisfactory.

Cost of Houses

When these notes were written, costs of the operation were not completely known. The amount allotted to TVA by the Federal Works Agency was \$2,850 per house complete, in place on the lot, but without land cost, outside utilities, landscaping design or off-side overhead. Actual costs are expected to come quite a bit under this amount, but it is impossible to say just how much.

Delivery of a 4-unit house (type D) and erection on previously built foundation, including service connection to utilities, took about 8 hr., the average length of haul from plant to site being 4½ mi. For the total project, including site development, utilities, landscaping, foundations, fabrication of structure, transportation and assembly, about 1,800 man-hr. at an average wage scale slightly above \$1 per hour were required for the average house.

Wages paid on the project were closely comparable to metropolitan wage levels. This fact is of importance when judging the cost of the project in comparison with conventionally built private housing which, in most localities, is typically non-union. In the course of production on the defense housing project, A.F.L. craft rules and restrictions were respected in all instances.

In line with its purpose of making the method of demountable construction known to all private builders who desire information, the Authority rendered assistance to Algernon Blair, contractor, Montgomery, Ala., who entered the lowest bid, predicated upon use of the same process, for construction of a similar defense project of 300 homes in west Tennessee, at Humboldt, Milan and Jackson. Mr. Blair's bids on houses very nearly identical with those constructed by TVA in the Tri-Cities area were as follows: \$2,626.34 for type B, \$3,035.08 for Type C, and \$2,229.42 for type D. These prices are for complete houses on the site but without landscaping and utilities. In the absence of final prices on the Tri-Cities houses, the Blair bids may well be regarded as a close indication of actual cost.

What may be regarded as the first retail sale of demountable, sectional houses took place in connection with the West Tennessee defense housing project when the

(Continued on page 90)

COFFING *Safety-Pull* HOISTS



SAFETY-PULL hoists lifting forms at Marshall-Ford Dam

**MORE PROFIT
LESS MAINTENANCE...
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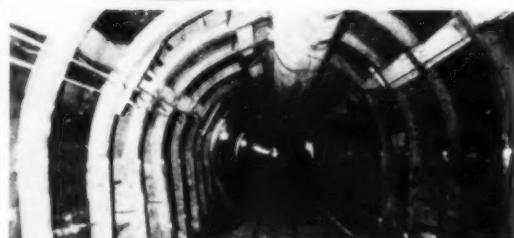
Here's a one-man tool that can do a hundred and one jobs on any construction project. One man and a Coffing Safety-Pull can lift, pull, move, and do many emergency and repair jobs. Then there are the big jobs where batteries can be set up such as shown in illustration. Here are 7 Model F Safety-Pulls lifting forms on the Marshall-Ford Dam in Texas. When used in batteries they exert powerful uniform action that makes them invaluable for many kinds of construction work. Let us send you circulars telling all about Coffing Safety-Pull Hoists—their safety features—their efficiency—their easy portability—their low first cost.

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...SMALL DIAMETER TUNNELING JOBS, LIKE THE DUCESNE TUNNEL, PROVO RIVER PROJECT, KAMAS, UTAH

• Whether tunneling jobs are large or small, it pays to select COMMERCIAL Liner Plates and Supports. Here's an example of COMMERCIAL Supports as applied in a small diameter job . . . the Duchesne Tunnel of the Provo River Project, Kamas, Utah. Safety, speed and economy were achieved on this tunnel through the use of these time and labor saving supports . . . and you can bring these same benefits to your next tunneling job with COMMERCIAL Plates or Supports. Size makes no difference . . . neither do ground conditions—COMMERCIAL has a size and type for every application. Let us tell you the complete COMMERCIAL story . . . it will be of particular cost saving value if you've a tunneling job in the near future. Write today!

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would build 2,095 Anti-Aircraft Guns**

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- ★ Now all of a sudden, for another reason, preformed is tremendously important—because wire rope that lasts longer conserves steel which America greatly needs.
- ★ For example, the steel conserved this year by the longer service of preformed wire rope will be enough to build 2,095 anti-aircraft guns.
- ★ Buying and using preformed wire rope is patriotism industrialized.

PREFORMED WIRE ROPE

Ask Your Own Wire Rope Manufacturer or Supplier



(Continued from page 88)

Rural Electrification Administration, in urgent need of power plant operators' houses, agreed with Mr. Blair to purchase ten units which will be produced in the same operation. This transaction may indicate the manner in which demountable housing will eventually reach the general public.

Production of Houses

Layout of the central production yard for the Tri-Cities defense housing project was extremely simple. The houses were assembled on building ways, or assembly lines, which consisted of parallel rails terminating in trucking roads; materials were delivered and completed houses were taken away in sectional units over these roads. The carpenters used the customary power tools such as electric saws and drills. Only one non-portable saw was employed on the entire operation.

In the first stage of construction, after materials had been cut to size, floor frames for the sectional units of each house were put together on the assembly line. A set of four wheels, mounted in the base of the floor frame of each unit, contributed much to the practicability of the demountable principle. In the production yard, the wheels enabled the houses to be rolled along the assembly line as they advanced through successive stages of construction. Stock sheave pulley wheels, 4½ in. in diameter, with 5/8 in. bolts for axles, were used. The wheels traveled on track made of ordinary 1-in. galvanized iron pipe fitted to the assembly line rack at the yard and to the girders of the house foundations at the building lot.

When completed, the floor frame units of a house were bolted together. With two major exceptions, construction from this point forward proceeded along conventional lines. One exception was the fabrication of wall frames, which were assembled on jig tables rather than erected piece by piece. The second exception was in the construction of the collapsible roof.

During construction of the house, it appeared that the structure was built as a single, inseparable unit. Actually, the house was built in sections as designed, but with the sectional units bolted together as they were erected. This practice assured a perfect match between units when they were reassembled on their foundation.

To make the roof collapsible, each side of the roof was hinged to the ceiling frame at a point near the eaves. When lowered, one half of the roof lay over the other. The height of a completed unit from base of floor frame to ridge of gable is about 14 ft., but with the roof collapsed the unit was only about 10½ ft. high. Headroom for a loaded trailer carrying a house unit with the roof lowered was 13½ ft.

Plumbing and Wiring — All plumbing and wiring were installed while the house was being built on the assembly line. By placing the kitchen sink on the opposite face of the bathroom wall, the plumbing was confined to a single unit, eliminating the need for plumbing connections between units. Electrical connections between units

(Continued on page 92)

WORLD-FAMOUS!

SMITH MIXERS are Achieving
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In South Africa — Argentine — India — New Zealand — Russia — Mexico — Japan — Hawaii — in fact, in practically every section of the globe — Smith Tilters are setting the pace for concrete mixers, producing millions of yards of uniform concrete on a fast, production basis. And, Smith-Mobile Truck Mixers and Agitators are earning big profits for ready-mixed concrete plants. Designed and fully guaranteed by SMITH — Mixer Manufacturers for more than 40 years. All standard sizes of concrete mixers, truck mixers, and agitators available. Write for literature.

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Lower Head Room

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Welded Construction insures longer wear — less breakage. Cutting down unnecessary weight means

faster work—more yardage. Williams sheave arrangement keeps leads straight, less friction and fraying—longer cable life. Sheaves protected against contact with bucket load; open end sheave block prevents clogging.

Bulletin describing each type of Williams Bucket FREE on request.

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GENERAL PURPOSE MULTIPLE ROPE BUCKET

WILLIAMS Buckets

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GOT GRADING TO DO? ... TRY THIS TRIO



HAVE YOU roads to build, an airport to grade, a camp site to level out—let these up-to-date Adams units handle the grading for you on schedule and at low cost . . . Use Adams Motor Graders for grading roads from bank to bank and for finishing work on all jobs. Available in six models (Diesel or gasoline power)—all have the high-blade-lift, bank-cutting feature . . . Use Adams Hauling Scrapers on your end-haul work. They load and haul easily, dump quickly and spread uniformly. Available in several sizes . . . Use Adams Tamping Rollers to tamp material on fills to exacting specifications. Provide wide range of compaction pressures and have removable-foot feature you will like . . . Of course, Adams Motor Graders find year 'round use on surface maintenance, scarifying, oil and stabilization mix, snow removal, etc. . . See your local Adams representative now for full particulars or write for catalogs directly to

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J. H. WILLIAMS & CO., 225 Lafayette Street, New York City

WILLIAMS
SUPERIOR DROP-FORGED TOOLS

Headquarters for drop-forged tools for over half a century



(Continued from page 90)

were made by a polarized lock plug, with the male outlet on one unit and the receptacle on the facing unit. Complete bathroom fixtures and kitchen equipment were installed before the house left the assembly line.

By the time a house reached the delivery end of the assembly line, it was complete except for the finish coat of paint. Units were unbolted from each other, and the roof panels were lowered. A truck pulled a light-weight, two-wheel trailer up to the end of the line, a pair of temporary rails were set in place, and the first unit was rolled on to the trailer.

Placing House on Foundations

Foundations consisted of two rows of cinder-block piers so spaced that two piers were located under each end of the house and each joint between units. Precast concrete girders were set in place on the piers, and the pipe rails which carry the wheels of the house unit were laid in grooves along the tops of the girders.

When a house unit arrived at the waiting foundation, it was raised off the trailer by a pair of portable chain hoist derricks, one on either side, permitting the trailer to pull away. Temporary rails then were extended from the foundation, and the unit was lowered on to the rails to be rolled into position, where it was bolted to the concrete girder.

Completing Roof — Unit joints in the roof were covered by insertion of individual shingles in alternating rows of roofing. In the even-numbered rows, the ends of the strips of composition shingles occurred at the unit joints. In the odd-numbered rows, each unit of strip shingles ended half a shingle width from the joint, thus leaving space for the insertion of the individual shingle. The length of the shingle provided sufficient overlap to cover the joint in the even-numbered row. This operation not only made the roof joint rain-proof but also gave the roof the appearance of having been laid continuously across the house, rather than as four sections. A continuous ridge row was applied in conventional fashion.

Of the finishing touches applied at the site, the major job involved the construction of the flue which, to conform to fire safety standards, could not be made demountable. The chimney is a vertical stack of hollow concrete cylinders, flue-lined and cemented together with mortar joints above the thimble, but set with dry joints and held together by an anchor rod below the thimble. The lower end of the rod is hooked to the chimney foundation and the upper end is bolted to a washer set in the cylinder forming the lower half of the thimble. Circulating heaters, some burning oil and others coal, were supplied with the houses.

Administration

Design and construction of the defense housing project for the Alabama Tri-Cities area were undertaken by the Tennessee Valley Authority acting as agent of the

(Continued on page 94)

14 TIMES 'ROUND THE WORLD



- without "truing-up"
a single crankshaft

That's saying perfect performance — no engine failures — no needless layups — plenty strong! And here is the whole story from Mr. D. E. Moffett, of Ogden and Moffett, Port Huron, Michigan.

"During the past two years," he relates, "we have added eight Model HB 150-horsepower Cummins Diesel motors to our fleet. Some of these engines have traveled as much as 350,000 miles without as much as turning a crankshaft down.

"We believe that RPM DELO has played a large part in running up this mileage" (equal to 14 times around the world). "It has kept our rings from sticking and crankcases cleaner for a longer period than any other oils tested . . . Consumption has been almost negligible. We be-

lieve RPM DELO is the oil for Cummins Diesels."

You can count on the same unequaled lubrication for any Diesel. And how you need it today, when every hour — every mile of trouble-free engine operation counts as never before! Insist on RPM DELO.

ORDER RPM DELO *Unequaled* FOR YOUR DIESELS

Approved by the makers of over 95% of the installed Diesel horsepower in America, RPM DELO is marketed under the following names:

RPM DELO
Kysco RPM DELO
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Caltex RPM DELO
Imperial-RPM DELO
CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your locality.



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ONE ENGINE FOR LOADING AND HOISTING ANOTHER SEPARATE ENGINE FOR SWINGING

This new Page Two-Engine Walker is a new development in large draglines . . . It provides FAST HOIST AND FAST SWING—AT THE SAME TIME! Visualize using ALL the power of your present dragline for *hoisting only*, without swinging the machine. Think how that would increase hoisting speed! Now consider a second independent engine for *swinging only* . . . speeding up the

swing in proportion to the faster hoist . . . This new Page Two-Engine Walker is a miracle of balanced power and increased production. Moreover, it is actually MORE COMPACT and COSTS LESS than a single engine dragline carrying the same total horsepower. The two-engine dragline, with exceedingly fast hoist and swing is setting new standards for large machines.

Before buying any dragline, investigate the Page Two-Engine Diesel-Powered Walker. Our engineers will explain its many features and show you Page draglines on the job!

PAGE ENGINEERING COMPANY

CLEARING POST OFFICE, CHICAGO

TELEPHONES PORTSMOUTH 9300, 9301; SUMMIT 380, 381

(Continued from page 92)

Federal Works Agency. Within the Authority, the project was designed and supervised by the Department of Regional Studies and was executed by the Construction and Maintenance Division. The scheme of construction is based upon an idea conceived by Louis Grandgent several years ago, when he was one of the architects in the service of the Authority. Roland A. Wank is head architect of TVA.

OUTLINE SPECIFICATIONS FOR TVA DEFENSE HOUSES

TYPES B, C, AND D

Footings and Foundations—Poured concrete footings, 2 ft. square, 12 in. thick. Cinder concrete block piers, 8x12 in., reinforced. Galvanized iron termite shields. Inclosure, $\frac{3}{16}$ -in. Transite, extending from bottom of exterior walls to ground.

Superstructure Walls (Exterior)—Frame construction, 2 x 6-in. studs 16 in. o.c.; $\frac{1}{2}$ -in.-thick, weatherproof, insulating fiber board, Homasote or equal, outside; $\frac{3}{8}$ -in.-thick, 4x8-ft. gypsum-core wallboard, ivory surfaced, with recessed edges equal to National Gypsum Co.'s Gold Bond Gypsum Wall Board, inside; wood splines under, and flush galvanized iron battens over exterior joints; wood battens over joints inside; wood trim at eaves, etc.; wood shiplap at gable ends.

Floor Construction and Finish Floor—Wood framing 2 x 6-in. joists approximately 24 in. o.c., framed flush with two 2x12-in. wood girders; wood subfloor; vapor-seal paper; $2\frac{1}{2} \times 3\frac{1}{4}$ -in. by random lengths, No. 2 Common and better, factory-finished oak flooring, end matched, with slightly beveled edges and ends, equal to Bruce Streamline Flooring, standard grade.

Roof and Ceiling—Ceiling joists and roof rafters, 2x6-in., approximately 18 in. o.c. Ceiling finished with $\frac{1}{2}$ -in.-thick insulation board V-jointed. Roof covered with 1x6-in. solid wood sheathing, building paper, and square butt slate-surfaced asphalt strip shingles, weighing approximately 210 lb. per square.

Interior Partitions—Studs, 2x3-in., 16 in. o.c., with $\frac{3}{8}$ -in.-thick, 4x8-ft. gypsum-core wallboard, ivory surfaced, with recessed edges, equal to National Gypsum Co.'s Gold Bond Gypsum Wall Board. Bath room walls around recessed bath tub to be surfaced with $\frac{3}{16}$ -in.-thick 4x8-ft. asbestos-cement board equal to Johns-Manville Co.'s Flexboard.

Interior Trim—Strictly C-grade yellow pine, kiln dried; base, door, and window trim, cornice and other moldings as required.

Windows—Stock steel casement sash and frames equal to Truscon Simplex HM horizontal muntin design, complete with glass, metal wicket screens, with 16-mesh copper screen wire, and hardware.

Doors—Wood panel doors, standard stock construction, doweled and glued, A-grade kiln dried pine. Exterior doors $1\frac{3}{4}$ in. thick, glazed, SSB glass. Interior doors $1\frac{1}{2}$ in. thick, five (5) cross panel stock design, yellow pine or fir.

Screen doors $1\frac{1}{2}$ in. thick, stock design, 16-mesh copper screen cloth with $\frac{1}{4}$ -in. mesh hardware cloth on lower panels.

Kitchen Cabinets, etc.—Four metal wall cabinets in B and C type; three metal wall cabinets in D type; white pine, sectional kitchen cabinet pan units similar to Curtis Co., $24\frac{1}{2}$ in. deep, 32 in. high as follows: Two P-30 in B and C types; one P-16 in B, C, and D types. (Table top electric water heater provides another work surface.) Metal medicine cabinet in bath rooms.

Chimney—Cinder concrete block chimney 4 in. thick with 8 in. diameter terra cotta flue lining to be built in the field on masonry foundation.

Painting—Exterior wood work and trim to be
(Continued on page 96)

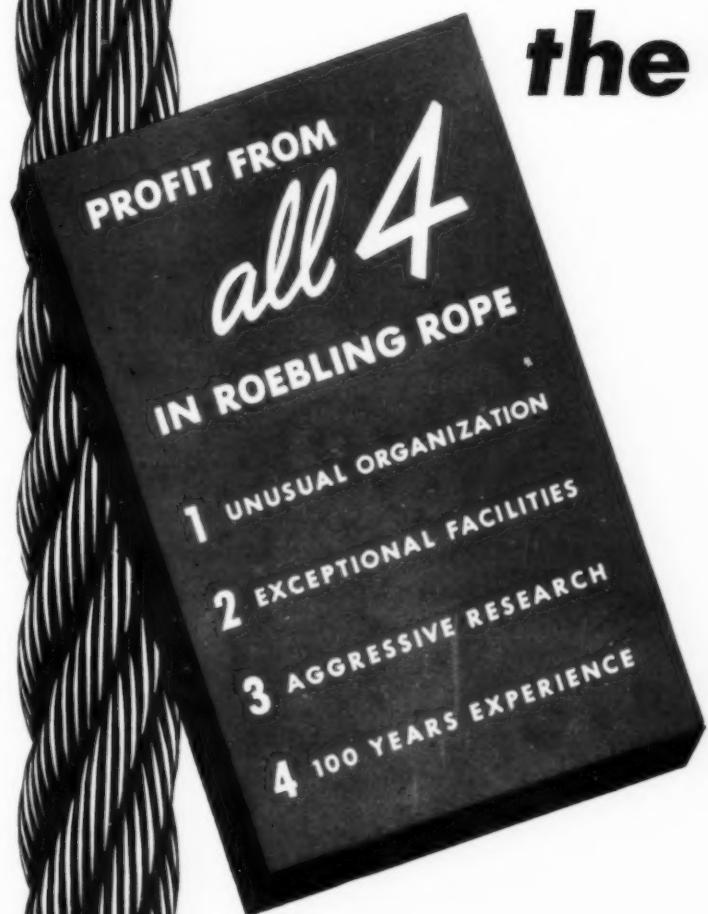


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The "Roebling 4" take guess-work out of wire rope performance.

We back up Roebling "Blue Center" Steel Wire Rope with this definite claim:— Roebling "Blue Center" will give you unexcelled *over-all* rope service—service that will assure you of minimum *general-average* rope operating cost.

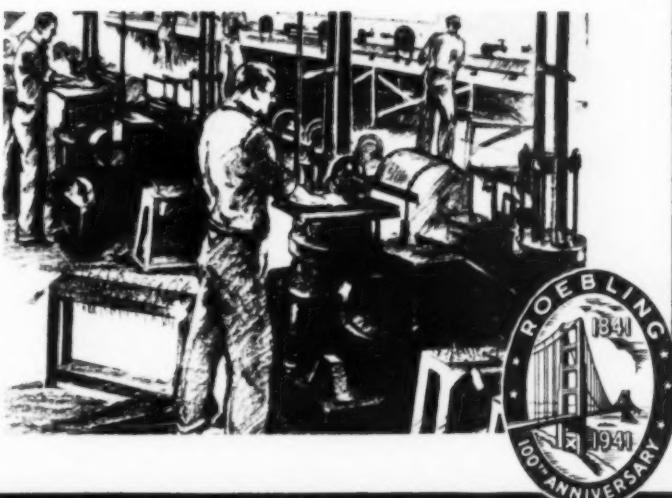
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In the Roebling testing laboratories we make certain that not even a single wire in a reel of Roebling Wire Rope is an unknown quantity.

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In Roebling "Blue Center" you get predetermined quality, known stamina, safety—of the highest degree.



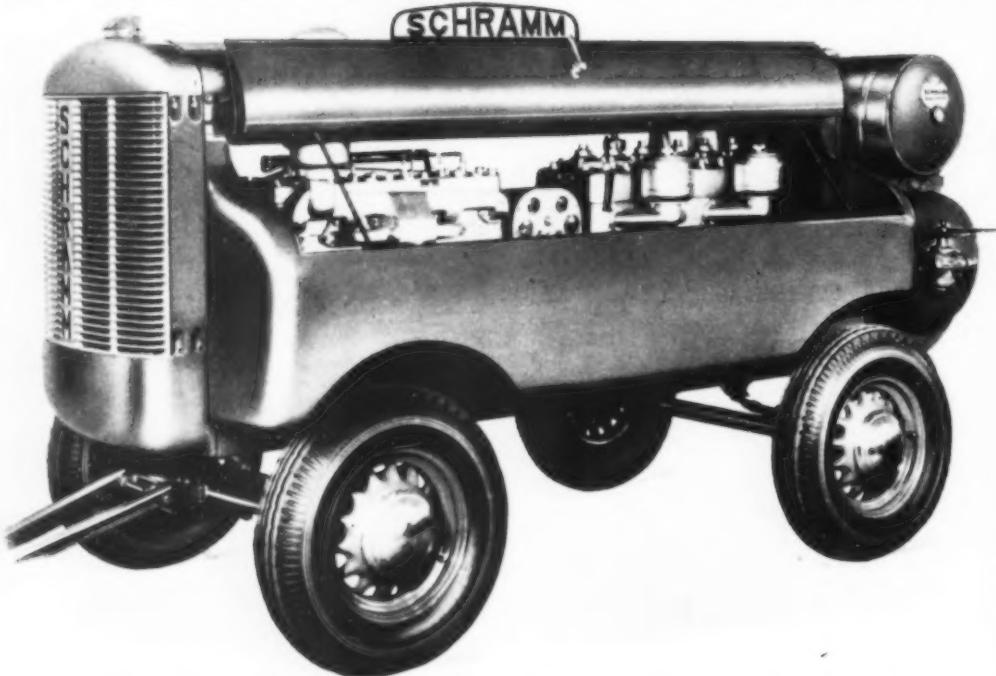
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SCHRAMM MODEL #210 GASOLINE ENGINE DRIVEN AIR COMPRESSOR

Mounted on Spring Trailer with Towing Coupling and
Streamlined Tool Boxes

WRITE FOR CATALOG 42-P

SCHRAMM, INC.

WEST CHESTER, PENNA.

(Continued from page 94)

painted two coats of lead and oil. All exterior wall board surfaces to be primed one coat of lead and oil and finished with one coat of Resitex or equal plastic paint.

Interior wall surfaces to be finished with one coat of Plasterez or equal plastic paint.

Interior door and wood trim to be finished with two coats of lead and oil paint.

All insulating fiber board ceilings to be finished similar to interior wall surfaces.

Plumbing — Combination sink and laundry tray. Recessed bath tub. Siphon action water closet with low-tank combination. Enamored steel lavatory. Galvanized steel water piping.

Heating — Circulating heater, oil- or coal-fired (optional) for B and C types. Coal-fired only for D type.

Fuel tank or coal bin outside.

Electrical Work — BX armored conductors. Outlets for electric range, electric water heater, refrigerator, convenience receptacles, and lighting outlets, switches, etc.

Electrical Equipment — Electric range. Electric refrigerator. Electric water heater, table top model.

The following extra items have not been included in this outline specification:

1. Galvanized iron gutters and downspouts.

2. Linoleum floor covering in kitchen and bath room.

3. Insulation material above the ceilings.

Certain demountable features of a cellular unit nature have been incorporated in the design for house types B, C and D. It is proposed to construct these houses in such a way that they may be demounted, transported to other locations, and re-erected on new foundations, thereby obtaining complete salvage value except for the foundation materials. Preliminary estimates indicate that first costs will not be increased by this method of construction over those to be experienced in building the same houses by standard methods.

* * *

Heavy Trusses

Spanning Subway Tubes

Lowered Into River

At Bridge Piers

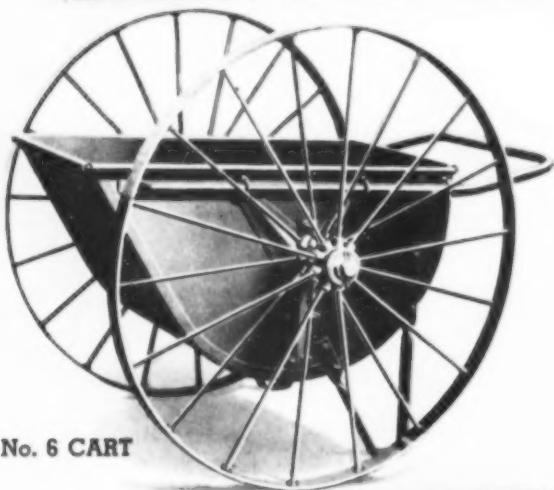
(Continued from page 54)

trate the operation of placing one of the trusses. The trusses, brought to the site on a barge, are of different shapes because the relation of the subway to the bridge is not the same at the two sides of the river. Two A-frame derricks on a barge picked up and lowered the trusses to place within cofferdams built for the subway tubes. Bracing of the front ends was removed to make way for the trusses. The cofferdams are to be enlarged and adapted to the bridge masonry requirements, and the bracing rebuilt as the water is pumped out.

John Roach is general superintendent and Richard Fox is project superintendent for the substructure contractors, FitzSi-

(Continued on page 98)

No. 6 CART



STERLING
WHEELBARROW CO.
7100 W. WALKER ST.
MILWAUKEE, WIS.

FOR HEAVY DUTY

12 gauge tray all welded.
 $\frac{1}{2}$ " dia. continuous butt-welded rod at top of tray.

Malleable brackets extending full depth of tray.

42" diameter wheels—flat or oval tire.

Plain or roller bearings.

Can be equipped with 44" diameter pneumatic tire wheels.

Other carts having 30" or 36" diameter steel wheels, and 30" diameter pneumatic tire wheels.

Defense Contractors

Rely on HEIL EARTH-MOVING EQUIPMENT for Trouble-Free, Profitable Operation!

High-speed operations on National Defense Projects call for "blitzkrieg" construction equipment designed and built to stand up under the strain of high-speed production schedules, twenty-four hours a day.—And that's why successful contractors on major construction projects all over the country are switching to Heil Cable-Operated Scrapers, for increased yardage production and lower operating costs.

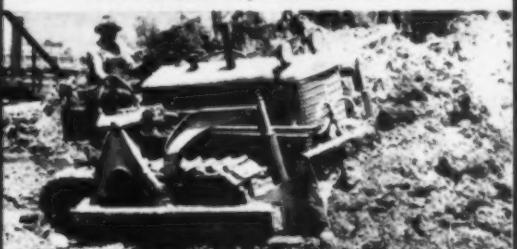
Faster loading—Easier unloading
—Bigger top loads—Lower cable re-

placement costs—Fewer service requirements—These are the extra features you get in Heil Scrapers that insure profitable, money-saving operation. Built in capacities from 6 to 25 yards, Heil Scrapers are available in the proper capacity for operation with any make or model of tractor. See your nearest Heil distributor, or write, wire, or phone us today . . .

Address:



Southwest Portland Cement Co. operate a fleet of these heavy Heil 30-ton side dump units near Victorville, Calif.



Heil Hydraulic Bulldozer and Model BD Cletrac at Sardis Dam near Holly Springs, Miss.



Heil Twin-Cable Scrapers on Defense Grading Project at Scott Field, Illinois.



Eight-yard Heil Scraper on a Building Project in Shelby County, Alabama.

**Equipment that is idle
earns no money, pays
no profits! That's why
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Fast... Effective... Money-Saving

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to keep your road building or construction equipment in efficient operating condition . . . or to help speed up overhaul and repair work.



Safe to use . . . State, County and City highway departments, contractors and others will tell you Oakite materials and methods help you remove muck and grime from equipment EASIER, with less manual effort, MORE THOROUGHLY and ECONOMICALLY.

Remember too, Oakite materials are backed by a binding GUARANTEE and our 32 years' successful experience.

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Contains 20 pages of valuable data describing fast, low-cost methods for cleaning all types of road building equipment; removing scale and rust from Diesel water jackets, water-cooled compressors; steam cleaning tractors, trucks, etc.; effective methods for quickly removing tar, paint from equipment. Write for your copy today!

Representatives in all
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OAKITE PRODUCTS, INC.
240 Themes St., New York



(Continued from page 96)

mons & Connell Dredge & Dock Co. The bridge is being built by the City of Chicago under the jurisdiction of O. E. Hewitt, commissioner of public works, W. W. DeBerard, city engineer and Stephen J. Michuda, engineer of bridges. Actual construction is under the supervision of Clarence S. Rowe, engineer of bridge construction, and Carl O. Johnson, resident engineer.

* * *

Concrete Storehouse at Navy Yard

Built in 48 Days

(Continued from page 55)

charge and Lt. Commander Frank A. Rossell, (C.E.C.), U.S.N.R., resident officer in charge. Evidence of the speed which characterized construction since the second floor was completed on June 24 is provided by daily progress reports indicating that one entire floor with its supporting columns has been built every 3 days.

During each of these 3-day periods, 200 tons of reinforcing steel were set, 2,100 cu.yd. of concrete were poured, 61,000 sq. ft. of floor finish was applied and all incidental mechanical and installation work was performed. At the same time, the exterior concrete wall inclosing one story of the building was put into place every two days. All of the construction was accomplished during the 48-day period, despite a 3-day loss due to the electrician's strike and the loss of 4½ days because of rain.

Foundation work was completed June 9, after difficult subsurface conditions were found which made it necessary for the excavators to go down 150 ft. to rock. A new type of 30-in. steel-pipe caisson was sealed into the rock for 6 to 8 ft. and filled with concrete and steel core.

The exterior of the building, rising to a height of 15 stories, each measuring 183x343 ft. and a 16th floor measuring 60x183 ft., exclusive of machinery and elevator space, is featured by the complete absence of windows on the first 11 floors, which are to be used for storage purposes. The remaining upper floors will provide modern office space designed to meet the steadily-growing needs of Navy Yard official and civilian personnel. Equipment on these floors will include the newest types of air-conditioning, acoustical and fluorescent lighting facilities. The building will have four passenger and four freight elevators, all operated by signal control.

An unusual safety record for a project of such magnitude was also reported. During the month of July, when eight entire

(Continued on page 100)

Get help in passing license exams from this practical book

Here is a compact, handy manual by two well-known engineering writers, that meets all needs for quick review of, or reference to the most important elements of designing simple structures — of special value to those preparing for license or registration exams.

Just Published

Elementary Structural Engineering

By LEONARD C. URQUHART
and CHARLES E. O'Rourke

Professors of Structural Engineering
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348 pages, 6x9, 204 illustrations. \$3.00

THIS book covers the fundamental principles of structural theory and design in steel, timber, and concrete, together with a discussion of the essential fundamental principles of mechanics and properties of structural materials.

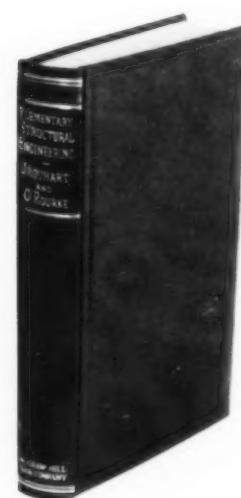
A concise explanation of the basic principles of structural mechanics has been included, to lead toward a deeper understanding of the subsequent design theories and methods.

Various methods of computing deflections of beams and trusses are outlined in another chapter, together with applications of these methods to typical practical problems.

The remaining chapters explain and apply the theories involved in the design of the various structural elements, such as homogeneous beams of timber and steel, plate girders, reinforced concrete beams, tension and compression members in steel and timber trusses, columns of timber, steel, and reinforced concrete, members subjected to bending and axial stresses, and footings.

See what the book gives you:

- helpful groundwork in the principles of structural mechanics
- useful thumb-nail review of materials; characteristics, properties, fabrication, working stresses, etc.
- chapter of classification and requirements of loads for various types of structures
- methods of computing deflections of beams and trusses
- elements applying to the design of connections and splices.



SEE IT 10 DAYS — MAIL THE COUPON

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Send me Urquhart and O'Rourke — Elementary Structural Engineering for 10 days' examination on approval. In 10 days I will send \$3.00 plus few cents postage, or return book postpaid. (Postage paid on orders accompanied by remittance.)

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THE BROOKLYN-BATTERY TUNNEL



ON October 28, 1940, President Roosevelt broke the ground for the Brooklyn-Battery Tunnel. Requiring an estimated six million man hours of labor over a period of four years, this will be one of the largest and most difficult engineering jobs of its kind ever undertaken in New York City. It will cost \$57,000,000 and have an annual capacity of 16,000,000 vehicles. The tunnel will be constructed, under contracts, by the New York City Tunnel Authority. The illustration at the left shows how the two dual lane tubes, each 10,000 feet long, will link the circumferential highway system of Manhattan with the Belt Parkway in Brooklyn.

CONSTRUCTION DETAILS

The tunnel will consist of two cast iron tubes, 31 feet in diameter, lined with concrete. Roadways will be 21 feet in width and accommodate two lanes of traffic. Fresh air ducts will be under the roadways, exhaust ducts above. In general, the design of the tubes is practically identical to that of the Holland, Lincoln and Queens-Midtown Tunnels.

DU PONT EXPLOSIVES AT WORK

Except for about 1,000 feet at the Manhattan end and 4,000 feet at the Brooklyn end, all of the subaqueous part of the tunnel—some 5,000 feet in each tunnel—will be through rock. The only rock work done thus far was in sinking the 82-foot Manhattan construction shaft. On this, Du Pont explosives were used exclusively.



THERE'S A DU PONT EXPLOSIVE FOR EVERY EXCAVATING AND TUNNELING JOB

► No matter what the nature of the job, there's a Du Pont explosive available to do it effectively and economically. We will gladly assist you in selecting the proper explosives and in getting the kind of results you want on the job. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.



EXPLOSIVES

and BLASTING
ACCESSORIES



... And there is One Best Construction and Type of Wire Rope for each and every Use

OF NECESSITY, all wire ropes do not operate under the same working conditions. Where small drums and sheaves are unavoidable, extra flexibility is necessary; where ropes are subjected to excessive surface wear, the outer wires should be relatively large; some ropes are required to handle extra heavy loads, others must work at high speeds, and there are many uses where a combination of severe conditions is encountered.

Maximum wire rope efficiency is obtained only when the rope used is of the type, grade and construction best suited to the particular conditions under which it is to work. In order to meet the numerous requirements, wire rope is made in a wide range of constructions, as well as in many different grades and in both Standard and Preformed types.

If you are not getting satisfactory wire rope results, it may be that you are not using the rope most suitable for your equipment. Ability to make proper selection comes with experience, so do not hesitate to call on wire rope manufacturers for the benefit of their research work.

Under present emergency conditions, the importance of using the right rope—as well as the importance of adopting all other means and methods of increasing efficiency—cannot be over-emphasized. This is neither the time nor the place for detours; instead, it is imperative that we travel the road that gets us to our desired destination in the shortest time possible.

This advertisement is published for the purpose of helping all wire rope users speed up their work, and at the same time obtain more economical service from their wire rope. Our experienced engineers will gladly help you solve any wire rope problem that may be giving you trouble.

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WIRE ROPE MAKERS
5909 KENNERLY AVENUE

ESTABLISHED 1857

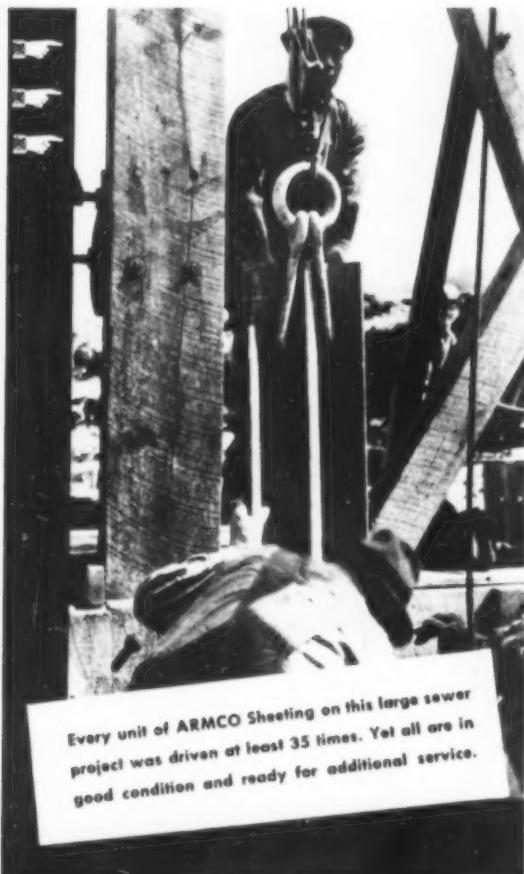
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There is a gage and type of ARMCO Sheeting to meet every requirement. Write us for complete information regarding its practical application to your specific jobs. ARMCO DRAINAGE PRODUCTS ASSOCIATION, 5013 Curtis Street, Middletown, O.



ARMCO SHEETING

(Continued from page 100)

plete brick bearing walls, were constructed because the Ingalls Iron Works, of Verona, Pa., delivered the structural steel ahead of schedule; in order not to delay steel erection, masonry supports had to be provided quickly to carry the ends of the main trusses without waiting for the full brick walls to be finished. As steel erection proceeded, the side walls were bricked in between the supporting masonry piers and topped out with stone coping.

Steel erection procedure consisted of first setting nine pairs of side trusses and then raising to place and making pin-connected field splices between the inner or cantilevered ends of these anchor arms and the ends of the corresponding central suspended spans. As truss erection progressed, 12-in. channels forming purlins spaced about 7½ ft. apart were tack-welded to the roof trusses. On the purlins and at right angles to them were laid light sub-purlins of rail-shaped steel shapes spaced 32 in. apart. Between the flanges of these supports were placed panels of Sheetrock ½ in. thick which not only served as bottom forms to support a 2½-in. thick poured gypsum roof deck until it had set, but also remained in place as a permanent finish for the underside of the roof. The tops of the sub-purlins served as guides for screeding the plastic gypsum to a rough finish. The gypsum roof slab is reinforced with wire mesh. The poured gypsum deck, which required 3 hr. for setting, was covered with a built-up tar and gravel roofing.

Walls and Floors

Exterior walls are 12 in. thick, consisting of 4 in. of face brick backed up with 8 in. of tile and topped with 4x10-in. stone coping.

Finish floors in manufacturing and storage areas of the big building are surfaced with an emulsified asphalt mastic 3½ in. thick on a 5-in.-thick concrete base reinforced with 6x6-in. wire mesh. The concrete base was poured by a paving mixer which commanded the 60-ft. width of the side aisles of the plant and made two passes to cover the 100-ft. wide central aisle. Transverse joints, containing a cork filler, were spaced 50 ft. apart.

Fluorescent Lighting

All light in the plant, except the cafeteria, is supplied by a total of 5,100 40-watt fluorescent lamps, about one-half of which are suspended directly from the bottom chords of the roof trusses. Manufacturing sections are lighted at an intensity of 40 foot-candles, said to be about twice as great as the average for similar plants. Westinghouse twin-lamp open-end luminaires are hung end to end to form continuous light troughs spaced 12 ft. 3 in. apart at heights varying from 10 to 13 ft.

Design and construction of the new fluorescent lamp plant at Fairmont, W. Va., was directed by the Westinghouse building construction and maintenance depart-

(Continued on page 104)

YOU SAVE AUTOMATICALLY



with Mall GASOLINE-POWERED VIBRATORS

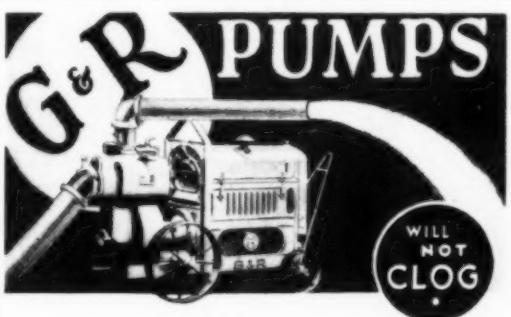
• No contractor can fail to save time, power, labor and material with this popular priced 1 H. P. MALL VIBRATOR. It is easy to start — runs by itself — operates all day on very little gasoline and is easily carried anywhere on the job by one man. The exclusive, patented MALL Vibrating Element places low-water-cement-ratio concrete better and faster than can be accomplished by any other method. Thus, it eliminates voids, increases water tightness and flexural strength, assures a better bond with reinforcement and permits an earlier stripping of forms. More than this, the interchangeable attachment feature makes this unit quickly convertible for Concrete Surfacing, Form Sanding, Drilling, Pumping, Sharpening Tools and Bits, Sawing with Circular Saw, Wire Brushing and Grinding.

Write for full details on this money-saving tool TODAY and ask for catalog of contractor's equipment.

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★ We make over 200 gasoline engine, air and electrically operated tools and attachments.



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Pump For The Least Money

Claims of fastest priming, highest suction lift, more gallons per minute, etc., do not pump water. On the job, the pump must do its own talking, and with dirty water, many a pump is inclined to stutter—and stop.

Let G & R Pumps tell you their own story on any job. They will deliver as much, and usually more, water under any condition, than any other pump. We will ship you one and let you be the judge.

Remember this about G & R Pumps—THEY WILL NOT CLOG—THEY ASK NO TIME OUT. Play safe! That is why more contractors are standardizing on G & R Pumps than on any other make.

Distributors in 100 principal cities are ready to make prompt delivery of the G & R Pumps you need.

THE GORMAN-RUPP CO. Mansfield, Ohio

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for 34 Years

Cantonments, ammunition plants, airports and other defense projects must be built quickly. Access roads must be constructed and snow removed. These are some of the jobs Baker Equipment is called upon to do and is doing well.

Throughout the years, Baker Bulldozers, Gradebuilders, Scrapers, Road Dices, Rooters, Maintainers and Snow Plows have served contractors as well as road and street officials. Baker has passed through many difficult pioneering days in developing its equipment and is proud, today, of its achievements.

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EQUIPMENT FOR EARTH MOVING ROAD MAINTENANCE AND SNOW REMOVAL



Four Ransome Pavers



Leaving the Ransome Plant

All in a Single Day!

Conclusive proof of widespread approval is this photograph of four Ransome Pavers leaving for points from Quebec to British West Indies.

Where there's such a demand there's a reason. For proved performance make yours a Ransome.

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3 Reasons why You're ahead with

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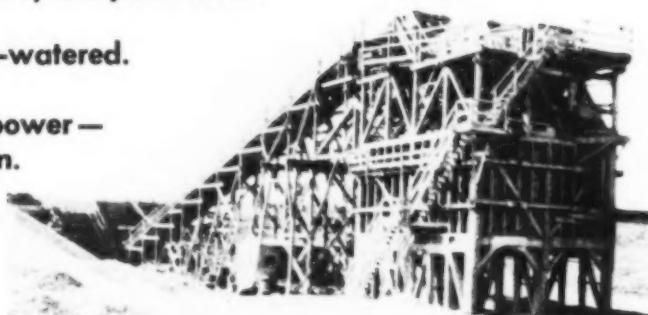
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GRAVEL
Washing and
Handling Units

1 Foreign substances completely removed.

2 Sand thoroughly de-watered.

3 Saves head room, power—
simplifies distribution.

The best results in cleaning sand and gravel are obtained through the use of Reliance System Revolving Screens and Paddle Type Boxes. Clay, loam and other foreign matter is completely removed and floated away. The sand is de-watered while being carried to the storage bin. The single sizing screen saves head room and power and simplifies distribution to storage. Send for Catalog No. 11.



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PRODUCTS**

Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettles; Bin Gates; Feeders; Belt Conveyors; Grizzlies; Air Separators; Sand and Gravel Spreaders; Wash Boxes.

UNIVERSAL ROAD MACHINERY CO.
KINGSTON, N. Y., U. S. A.

Distributors in ALL principle cities of the U. S. A.

(Continued from page 102)

ment headed by George Parkman, with Charles B. Sittman as chief designer. Field operations at the site were in charge of George W. Schusler, construction superintendent.

* * *

Sixteen Shipways

Built at

Average Rate of

One Every Two Weeks

(Continued from page 46)

tions. In general, the top layer of soft silt, or marsh muck, extends to a depth of 15 to 20 ft. and lies on a bed of medium to coarse sand of irregular thickness. Under this material ordinarily is found another layer of silt and very fine sand extending to a deeper layer of sand at variable depth. Preliminary test piles were driven by the contractor to determine pile lengths for ordering, and during the driving of foundation piles, test units were driven at frequent intervals, as will be described later.

Shipways

Existing shipways were enlarged and new shipways are constructed to provide for fabrication of steel ships, all welded except for riveted longitudinal seams, measuring 427 ft. in length at low water line and 57 ft. in extreme breadth. Fully outfitted but unloaded, each ship weighs 3,600 tons; it has a capacity to carry 10,500 dead weight tons.

To accommodate ships of this size, the four older shipways, of reinforced-concrete frame construction on wood pile foundations, were extended at the head end by the addition of timber pile bents carrying concrete deck, and the old concrete deck was thickened to carry increased loads. The outboard portions of these ways were inclosed in steel sheetpile cofferdams for a distance of about 112 ft., and the cofferdams were unwatered to permit examination of old piles after the shipway timbers and caps had been removed, prior to rehabilitating the structures.

Two of the old shipways are served by bridge cranes on overhead craneways of sufficient length to need no extension. The remaining two ways are served by tower cranes, as are all the new ways. Although tower cranes take more space between shipways and provide less visibility for the operators, they are advantageous for a rush job because they can be erected and put in service at a great saving in time and cost over bridge cranes.

Construction of the twelve new shipways and of the craneways to serve them

(Continued on page 106)

NEW!

IMPROVED SUPER-LUBRICANT

KEEPS ENGINES CLEANER
. . . LUBRICATES BETTER



LION

Naturalube

FOR DIESEL AND HEAVY DUTY

D.H.D.
OIL

Naturalube D. H. D. is made from a rare and basically different crude oil which imparts to the finished product a 3 to 10 times stronger protective film . . . greater adhesiveness and penetrativeness . . . and ability to remove hard carbon deposits. By special processing, Naturalube D. H. D. is reinforced or fortified to resist the deteriorating effects of extreme heat and oxidation. Results — engines are cleaner; rings and valves operate more freely for longer periods; no clogging of filters, screens or oil lines (i.e. clogging attributable to oil). There is no hard-carbon scuffing; general engine performance is greatly improved; operating and maintenance costs are lower; shutdown time is minimized. D. H. D. is non-corrosive — safe. It saves wear, adds power and saves fuel. Try D. H. D. — Your money back if you don't believe it to be the best oil you ever used!

BASICALLY DIFFERENT!
SPECIALY PROCESSED!
REINFORCED!

- 3 to 10 Times Stronger Protective Film
- Removes Hard Carbon
- More Adhesive and Penetrative
- Non-Corrosive—Safe
- Keeps Piston Rings Free
- Adds Power, Saves Fuel, Saves Wear and Shut-Down Time

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BY LEADING ENGINE
MANUFACTURERS

Write for free brochure "New-Type Lubricating Oils" containing proof of Naturalube's money-saving properties and details of money-back guarantee. Address Advertising Dept., Lion Oil Refining Company, El Dorado, Ark.

Made By LION OIL REFINING COMPANY

El Dorado, Ark.



LION
PETROLEUM PRODUCTS

**Ask ANYBODY.
in the building game
and you'll hear:**

**"I'd rather have
SKILSAW!"**

**the original . . . the finest . . .
the world's largest selling
PORTABLE ELECTRIC SAW!**



**The Big Builder
Says:**

SKILSAW is one of our best investments—it reduces our sawing costs and gives us many years of trouble-free service, without break-downs or costly maintenance.

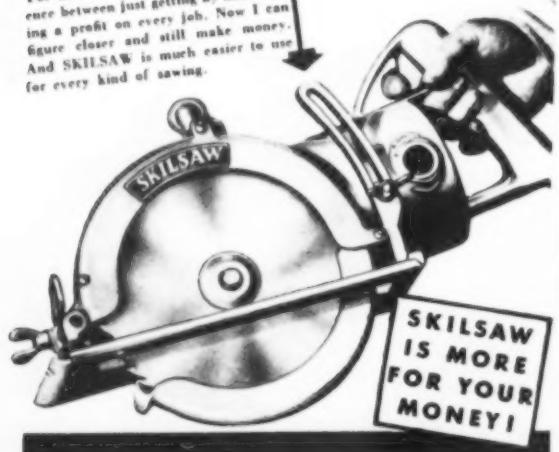


The Superintendent Says:
SKILSAW is a life-saver for me, now that good help is getting so scarce. My men get more work done with the help of SKILSAW and my jobs get done faster.



The Carpenter Says:

For me, SKILSAW means the difference between just getting by and making a profit on every job. Now I can figure closer and still make money. And SKILSAW is much easier to use for every kind of sawing.



If you're confused by rival claims for electric handsaws, just ask the men who use them—and you'll see why SKILSAW is bought by **MORE contractors of every type than all other makes combined!**

Whether the job is small home construction or the biggest commercial project, SKILSAW's faster cutting power speeds up every sawing operation and **brings costs down**—with it you'll turn more bids into jobs, more jobs into **profit!** SKILSAW is lighter, better balanced, better built, easier to use. That's why **ANYBODY** in the building game will tell you: "Look them all over and you'll buy SKILSAW!"

**9 POWERFUL MODELS FOR WOOD,
METALS, STONE AND COMPOSITIONS**

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5045 Elston Ave., Chicago

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Atlanta • Buffalo • Cleveland • Dallas
Kansas City, Mo. • New Orleans
Los Angeles • Oakland • Seattle
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(Continued from page 104)
furnished the main problem in the contractor's planning. Each of the new shipways has a total length of 638 ft. made up of an inboard way 450 ft. long and an outboard way 188 ft. in length. The ways slope at a uniform rate of $\frac{5}{8}$ in. per foot from a height of about El. 22 at the head of the inboard way to a depth of about El. -11 at the lower end of the



SKID-MOUNTED FLOODLIGHT TOWERS 42 ft. high carry four 1,000-w. lamps and reflectors. Tower posts are 1½-in. pipe, horizontals are 1-in. pipe, and diagonals are 1-in. angles.

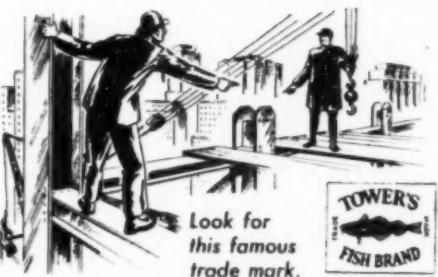
outboard way. At the junction of the inboard and outboard ways, the deck is at El. -1.19.

Although the load on a shipway is, for all practical purposes, uniformly distributed while a ship under construction remains stationary, the loading diagram shows marked increases of load toward the lower end of the inboard way and the upper part of the outboard way when a ship is being launched. The structures were designed by the consulting engineers to take care of these launching loads.

In general, the shipways are spaced 100 ft., c. to. c., with an 18-ft.-gage track for tower cranes between adjacent ways. Each shipway is served by two cranes, one on either side, requiring two cranes on each intermediate craneway. Inboard ways are made 72 ft. wide to allow for construction of ships with a breadth of 57 ft., but the outboard ways are reduced to a width just sufficient to accommodate the launching tracks, or groundways, by means of which a completed hull is slid into the water.

At the upper end of each inboard way

MEN—get complete allweather protection with **TOWER RUBBERIZED (A LATEX PRODUCT) SUITS, COATS and HATS ALSO AVAILABLE IN OILED FABRICS**



Look for this famous trade mark.

PRESERVE YOUR WATERPROOF!

It is indicated that NATIONAL DEFENSE needs may soon cause a shortage of waterproof garments. We urge that during the emergency every reasonable precaution be taken to properly care for and thereby preserve your waterproof coats and hats.

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Makers of Waterproof Clothing Since 1836

An average man with a 50-ton Simplex Journal Jack can lift more than 690 times his own weight!

The really big lifting, lowering, moving and supporting jobs on major construction projects call for the use of Simplex Journal Jacks—4 sizes, 15, 25, 35 and 50-ton capacities. They are tougher than tough, provide maximum stability and safety. Lift loads nearly half a foot at one setting. Safety stop prevents over-extension. Speed today's vital projects by equipping construction crews with these time and labor-saving tools. These, as well as Simplex Automatic Raising and Lowering Jacks, Screw Jacks, Hydraulic Jacks and other cost-cutting construction jacks, are shown in Catalog 41—get your copy.

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Better, Safer Construction Jacks Since 1899

Simplex Jacks

dependable and efficient

Lever Type for toe and cap lifting.

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THESE 2 LABELS MEAN PROTECTION OF LIFE AND PROPERTY



SAFE-LINE WIRE ROPE CLAMP



Robins uses the best materials and doesn't skimp on quality of workmanship. Robins Triple Grease Seals keep grease in and dust out. Pulley assemblies are identical, interchangeable, reversible. "One-Shot" lubrication fills all bearing chambers from either side—no dangerous reaching under the belt or loose grease pipes.

ROBINS CONVEYING BELT COMPANY
PASSAIC, NEW JERSEY



is a reinforced-concrete headhouse 77 ft. long, with a concrete deck supported by six lines of columns on wood foundation piles. Adjoining the headhouse is a section of timber deck 194 ft. long resting on 47 timber pile bents which extend above ground to the proper elevation for the caps. Three firewalls under the deck are included in this section to prevent spread of any fire. At the lower end of the inboard way, where the load becomes heavier during a ship's launching, is a 179-ft. section of concrete deck supported by 54 pile bents. In all, 1,728 piles are required for each inboard way.

Outboard ways are of all-timber construction, and the spacing of pile bents is varied to meet the loading conditions. Starting at the inboard end, the spacing of bents is as follows: 32 spaces at 2½ ft., 11 spaces at 3 ft., and 19 spaces at 4 ft. For the 188-ft. length of the outboard way, the supporting bents require about 450 piles. In the heavily loaded portion, end piles are battered in every second bent; in the section of less loading, battered piles are called for at every third bent. On the outboard ways the contractor planned to use a combination of coffer-dam and underwater methods, with divers performing the underwater work.

Launching Ways

Down the center of each inboard way are laid the keel timbers, or keel blocks, consisting of four 12x14-in. pieces of long leaf yellow pine with blocking between to make up a total width of 5 ft. The keel timbers are notched every 4 ft. to form a level seat for the keel blocks which support the ship's keel. At a distance of 10 ft. off center line on both sides of the keel timbers are the groundways, made up of three bolted pieces of 12x12-in. long leaf yellow pine set up to higher elevation on heavy blocks supported by the pile bents. The groundways are given a sand-finished surface to facilitate sliding; they have a cross slope of $\frac{3}{8}$ in. per foot down toward the center line of the shipway. In this shipyard, the groundways are fixed permanently in position on each shipway and are not made removable as ordinarily.

With the exception of the pieces mentioned and of 4-in. green oak plank used in the deck, the structural timber in the shipways is Douglas fir. The best grade is specified for all timber. Fir caps are drift-pinned to the piles of the pile bents. At each of the outer edges of the inboard ways, a string piece of fir is drift-pinned through the caps into the piles, and another fir stringer, called the bilge cribbing, is similarly secured at a clear distance of 12 ft. inside the string piece. Accompanying photographs show some details of the timber construction. Teco spike grids were used extensively in the bolted timber splices.

Quantities involved in the timber structures are large. Of Douglas fir, 1,000,000 b.ft. was required in the inboard ways, 700,000 b.ft. in the outboard ways, and 1,000,000 b.ft. in the piers and bulkheads, giving a total of almost 3,000,000 b. ft.

(Continued on page 108)



Completion of the new Willow Cloverleaf south of Cleveland marked another milestone in Ohio's highway safety program. Modern construction methods were used throughout, including steel Monotubes for the installation of more than 800 cast-in-place concrete piles.

The list of prominent projects using Monotubes is mounting daily. The reason—Monotubes offer the simplest and speediest method of producing dependable cast-in-place concrete piles ever devised. These light weight tapered steel casings cut handling time and costs. Driving time is reduced because Monotubes require no core or mandrel. There's no cumbersome driving rig to slow you down, either—any crawler crane equipped with standard leads and hammer does an efficient job.

There's a size and gauge of Monotube to meet every soil condition. Write for Catalog No. 68A.

THE
UNION METAL
MANUFACTURING
COMPANY
CANTON • OHIO

Riggers attaching one of the half-mile-long 3-inch main cableways to the head tower. The work is being handled from a scaffold suspended from the hook of the AMERICAN Pillar Crane which is permanently mounted on top of the 460-foot head tower. Notice how many CROSBY CLIPS appear in this striking picture.



*"Yep, a pretty
lofty perch,"*
**BUT LOOK AT
THE PROTECTION**

genuine CROSBY CLIPS"

When you work in a swinging scaffold hung from a "sky hook" 460 feet straight up, that's when you want to KNOW that the cable fastenings are one hundred per cent safe. The one sure way to KNOW is to standardize on Genuine CROSBY CLIPS.

Experienced riggers swear by the Genuine CROSBY CLIP because they know its dependability is proved by a 58-year safety record and that it has everything it takes to hold wire rope safely in any service: correct gripping design; generously proportioned drop forged steel base; over-size U-bolt and nuts; a thick anti-rust armor of zinc applied by the Hot Dip process.

Dealers with stocks of all sizes in all principal cities.

AMERICAN HOIST & DERRICK CO.

CHICAGO, ST. PAUL, MINN., NEW YORK

AMERICAN TERRY DERRICK CO., SOUTH KEEBRY, N. J.



(Continued from page 107)

for fir. Long leaf yellow pine timbers amount to about 1,100,000 b.ft., and oak decks called for about 1,000,000 b.ft. Drift pins 2½ to 4 ft. long, 1 in. diameter, add up to a weight of 105 tons; in addition, the job has required 180 tons of 1-in. bolt stock for bolting timbers and for anchors in concrete.

Craneways

Early in the job the contractor learned that time was to be gained by completing craneways well in advance of work on the shipways. The crane rails are supported by continuous concrete footings on pile foundations. By completing the track structure and included sections of intersecting utility tunnel ahead of the shipway construction, an unobstructed roadway was left clear between shipways for



BETWEEN ANCHOR BOLTS which secure continuous steel plate to craneway rail footing, welder attaches bolts for rail clips to steel plate.

movement of equipment and materials, and the erection of the tower cranes by Bethlehem Steel erectors was expedited. The craneways are 685½ ft. long, extending 235½ ft. beyond the headhouses into the assembly space for ship steel.

Crane rails rest on continuous steel plates grouted to grade on top of the footings. Each continuous plate is secured to the footing by two anchor bolts every 2 ft. In the intermediate spaces between the anchor bolts, at intervals of 2 ft., bolts are welded to the steel plate to hold the crane rail with rail clips. The craneways required 22,000 anchor bolts and 22,000 bolts welded in place for rail fastenings.

On the craneways serving the shipways operate 27 diesel-electric tower cranes of 15-ton-capacity powered by 180-hp. diesel engines driving 125-kw. d.c. generators. Nineteen of the cranes were supplied by Clyde, five by Orton, and three

(Continued on page 110)

A BIG, FULL LOAD WITH EACH BITE



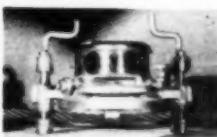
Because of their design and construction, Industrial Brownhoist clamshell buckets take extremely full loads with each bite, practically eliminate the need for hand shoveling, speed up material handling and cut handling costs. Quantity production plus our manufacturer-direct-to-you sales policy reduces your bucket investment. Write today.

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If's Rigged to Go!

★ No setting up, no deadending of the line, no paper calculations required when you measure wire line tension with a Martin-Decker Tension Indicator . . .



FAST!—Just clamp it to the line.

EASY!—Simply read the dial.

ACCURATE!—Indicates actual pounds tension.

Catches strong, steady pulls as well as those damaging impact loads that defy accurate calculation and speed line wear. Saves time, saves lines and cables, increases safety on any line job in the field.

MINIATURE—for lines up to 1/4", capacity 200 pounds

STANDARD—for 1/4" to 3/4" lines, capacity 15,000 pounds

HEAVY DUTY—for lines 3/4" to 1 1/4" inclusive

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**THESE FLEET OPERATORS
WILL TELL YOU—
*STANDARD OIL FLEET
SERVICE CUTS COSTS
MANY WAYS***



**CONTRACTOR SAVES "...18% ON
FUEL...25% ON LUBRICANT"**

Let Mr. Irving Severson of the H. A. Raemisch Company, Dane, Wisconsin, tell you the whole story.

"On moving into Iowa for the first time, we were contacted by your salesman and informed of your products and service. We became interested and decided to give your company a trial. Following the recommendations of fuels and lubricants made by your Automotive Engineer, we have found that we made a saving of 18% on fuels and 25% on lubricants. Your Stanolex Diesel Fuel has given us complete satisfaction in both our four-cycle and two-cycle engines.

"We feel this service has been a prime factor in our maintaining the schedule on this job."

Standard Oil Engineers are thoroughly trained and experienced to help you with your Diesel equipment operating problems.



(Left to right) D. R. Stapleton, Standard Oil Automotive Engineer, with representatives of Glendening Motorways, Richard Parnell, Fleet Superintendent, and W. R. Palmer, testing one of the Glendening units. All Standard Oil engineers have portable instruments for making these tests.

**DIESEL TRUCK OPERATOR
GETS LOWER MAINTENANCE**

"We can honestly say that through proper maintenance, the use of your lubricating oil and fuel, and the engineering assistance your company offers, we will be able to keep our Diesel equipment operating without important part replacements for over 250,000 miles per unit."

That statement by W. Gordon Glendening, president of the Glendening Motorways, is based on over a million miles of trouble-free Diesel operating experience on motor freight service between Chicago and Wisconsin and Minnesota cities.

**BUS FLEET OWNER FINDS
ONE MILE MORE PER GALLON**

Even the modern buses shown below, operated by Balcer Bros., Bay City, Mich., picked up one mile per gallon when Standard Red Crown was adopted and a Standard Oil Automotive Engineer helped the fleet maintenance men take full advantage of its economy.

There's no mystery about the service these Engineers render. The methods they use and the equipment they have for checking fleet equipment are familiar to many fleet operators. They do have one advantage. They know their automotive fuels and lubricants and how these products should perform under various conditions. When performance isn't up to par they have instruments for finding out why. It's as simple as that—but it works.

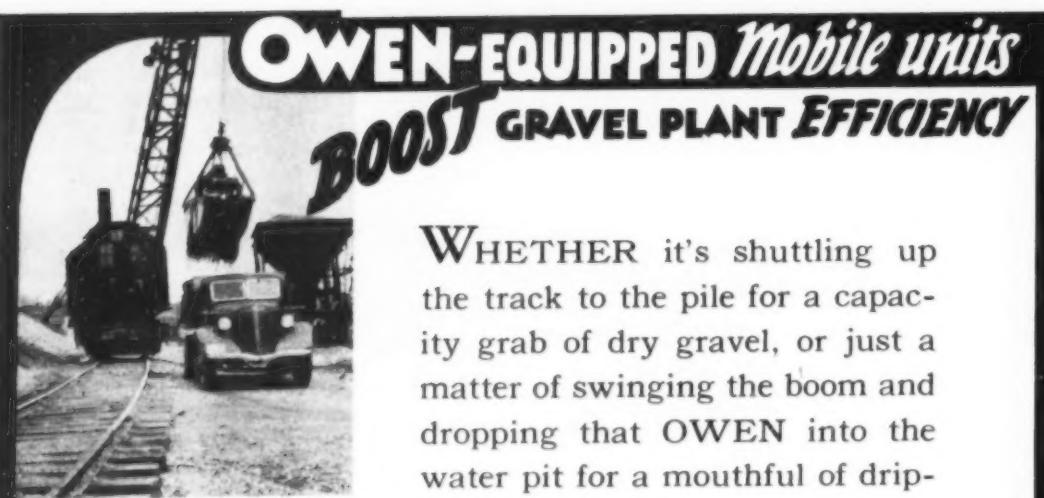
A card to your local Standard Oil Company (Indiana) office or 910 South Michigan Avenue, Chicago, Illinois, will reach the Engineer that you want. In Nebraska, write Standard Oil Company of Nebraska at Omaha.

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**STANDARD OIL COMPANY (INDIANA)
AUTOMOTIVE ENGINEERING SERVICE**

LOWERS
MILEAGE
COSTS



WHETHER it's shuttling up the track to the pile for a capacity grab of dry gravel, or just a matter of swinging the boom and dropping that OWEN into the water pit for a mouthful of drip-

ping aggregate,—one thing is certain; for greatest daily output with minimum operating cost "OWENIZED" mobile units are requisite.

The OWEN BUCKET Co.
6020 BREAKWATER AVE., CLEVELAND, OHIO
BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.



HOW Small Tools CAN CUT CONSTRUCTION COSTS

● Tremendous savings can result from proper selection and use of small tools. For they bulk large in the sum total of field costs.

Every construction contract involves a substantial amount of light-duty work such as sawing, boring, cutting, grinding, bolting, jacking, hammering, pushing, pulling, twisting, pipe-threading and sharpening.

For these light-duty operations there are available a full line of modern, highly efficient small tools, many of them powered by electricity, gas or compressed air. They're designed to cut the time and cost of strictly hand labor methods.

For example, the current shortage of carpenters (who are tied up on defense projects) is reflected in the increasing use of various types of power saws.

Therefore, Construction Methods will publish a special, illustrated section de-

voted exclusively to "Small Tools On Construction" in the forthcoming November issue. In these pages it will picture and describe a great variety of practical applications of various types of small tools on both non-military and defense projects.

Here is a valuable addition to Construction Methods editorial service. It's designed to help construction men do a faster, better, cheaper job.

This issue can be extremely useful to other members of your organization. A limited number of extra copies will be available at 20c each.

Write to:
R. K. TOMLIN, Editor
CONSTRUCTION METHODS
330 West 42nd Street, New York, N. Y.

(Continued from page 108)
by Dravo. The two outfitting piers are equipped with four Industrial-Brownhoist tower cranes of 20-ton capacity.

Piledriving

To speed driving of the thousands of in-board piles, the contractor's engineers designed and built on the job four 77-ft. all-welded steel leads capable of handling piles up to 70 ft. long. The leads were hung from crane booms. Three leads of the type illustrated by an accompanying drawing were mounted on two P&H 15-ton gasoline cranes and on an American Gopher 15-ton crane. A fourth set of adjustable welded hanging leads which could be lowered to follow piles down along the water's edge were suspended on the 85-ft. boom of a Wiley steam whirley traveling on rails.

Using generally Vulcan No. 1 5,000-lb. single-acting steam hammers, each of these



EMBEDDED SHEETPILES in edge of concrete deck at outboard end of inboard way provide starting piles for cofferdam constructed at junction point of inboard and outboard ways.

rigs was able to drive 65 to 70 piles per shift. For outboard work, the contractor had two floating piledrivers, supplemented by a skid pile-driver on the piers and bulkheads. Steel sheetpiles were driven by a steam hammer, equipped with guides, hung from the load line of one of three Wiley steam whirleys with 75-ft. booms mounted on scows. Double-acting hammers were used on steel sheeting and on batter piles. In all, the job was equipped with five Vulcan No. 1 hammers, four Vulcan No. 2, two McKiernan-Terry No. 7, one McKiernan-Terry No. 6 and two Union No. 1½A.

Inboard piles were driven to a required minimum bearing of 15 tons and outboard to a minimum bearing of 20 tons, computed by the *Engineering News* formula. At a depth of about 20 ft., piles generally

(Continued on page 112)

AGGREGATE **BITUMEN**

INTERLOCKED PROPORTIONING

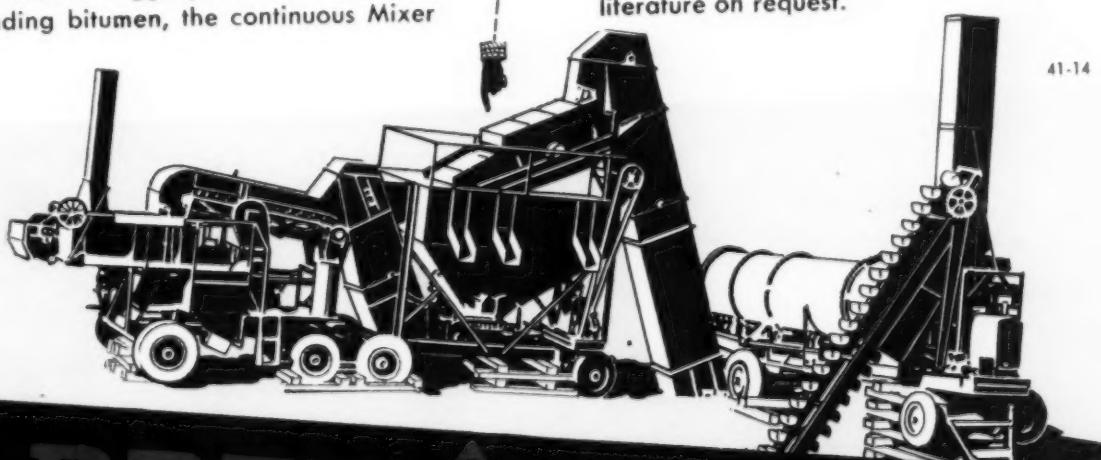
ONLY in the Continuous Mixer is the ratio of aggregate to bitumen mechanically interlocked. The volumetric proportioning is calibrated by weight, the ratio set and locked, and the entire job run with interlocked proportioning.

Even the most skillful mixer operators cannot maintain, hour after hour, the untiring precision of interlocked proportioning.

In addition to accurately measuring each size of aggregate and the corresponding bitumen, the continuous Mixer

constantly feeds the aggregate and bitumen into the pugmill in a small continuous stream—in practically a homogeneous distribution at the start of the mixing.

These advantages plus the unequalled economy of the Continuous Mixer make it truly tomorrow's Mixer today. Regardless of your present equipment, you should at least have a complete understanding of the basic principles of the Continuous Bituminous Mixer. Complete literature on request.



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BARBER BUILT **GREENE**
STANDARDIZED INDUSTRIAL HAND AND POWER MACHINES
AURORA G ILLINOIS

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Spirolocs

Pat. No. 1,925,689

FOR ALL TYPES OF CONCRETE CONSTRUCTION

Furnished with either Handle Washers or Nut Washers



Spirolocs showing Handle Washers, Stud Rods and a Threaded Tie Rod

(Each Assembly consists of Two Washers and Two Stud Rods)

The Assembly

Features:

1. Easily inserted through holes drilled in the sheathing of the wall forms.
2. Wide Range of Adjustment to accommodate any dimensions of form lumber without removing the washers.
3. Keeps the tie rods the required distance back from the wall face.
4. Permits removal of the tie rod when required.
5. Leaves a small hole to be grouted.

The Spiroloc Washer Combination

The Combination of an Assembly using one Nut Washer and one Handle Washer:

1. Allows complete installation of the assembly, except handle washer from one side of the forms.
2. Nut Washer acts as a stop to prevent the assembly from passing through the forms.
3. Handle Washer is slipped over the Stud Rod on the other side of the forms, seated against the wale and tightened with one complete turn.



Spirolocs showing Nut Washers, Stud Rods, Cone Nuts and threaded tie rod

These assemblies may be rented with an option to purchase

"Universal Products for Concrete Construction"

Manufactured by

UNIVERSAL FORM CLAMP CO.

General Offices:

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Branches:

New York Cleveland Houston Atlanta

(Continued from page 110)
struck a layer of sand not thick enough to stop the piles in, requiring that the piles be driven on down to varying depths to reach another layer of sand of irregular thickness. Because of the uncertain conditions, the engineers set up special rules to govern piledriving, and inspectors kept a record of blows per foot for every pile.

Test piles of selected, long, heavy hardwood were put down at a minimum spacing of 50 ft. in each direction and were driven considerably below the penetration at which 15-ton bearing by the *Engineering News* formula was reached. The added penetration was designed to test the depth of the sand layer, which was judged



FLOATING PILEDRIVER and skid rig put down piles for piers and bulkheads.

satisfactory when the pile driven by a Vulcan No. 1 hammer penetrated: (a) 15 ft. or more of depth at 13 or more blows per foot; (b) 10 ft. or more at 15 to 20 blows per foot; (c) 5 ft. or more at 20 to 25 blows per foot.

Other piles were required to be driven at least 5 ft. at eight blows per foot and to be stopped when a driving resistance necessitating thirteen blows per foot (15-ton bearing) was obtained. This rule admitted of only one exception: When the blows per foot reached 25, driving had to be stopped for fear of damaging the pile.

Excavation

Because the thin earth crust on the marsh mud had to be left undisturbed to support the piledriving rigs, it was necessary to postpone excavation for all structures such as craneway rail footings until after the piles had been driven. For close excavating work around driven piles, two Michigan truck cranes equipped with $\frac{3}{8}$ -yd. clamshells proved extremely useful. The cranes were supplemented by hand

(Continued on page 113)

FOR TOUGH JOBS

GATKE
ASBESTOS
BRAKE LINING
CLUTCH FACINGS
AND FRICTIONS

Developing Better and Better Materials to lick tough jobs has kept GATKE out in front. Extensive experience with every kind of equipment has taught us the problems and service needs of operators



Whatever your service, just tell us what you need.

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"Going Good"

and making GOOD MONEY for us", says W. C. White & Son, Dayton, Ohio about their

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labor. Another Michigan unit and a Bay City 20-ton truck crane were kept busy unloading and handling materials on the job, while two 1½-yd. crawler clamshell excavators, a Lorain diesel and a gasoline Speederane, were used on heavier digging jobs.

In the river offshore from the shipyard, an Arundel clamshell crane equipped with a 7½-yd. bucket is dredging the river bottom to a maximum depth of El. 22, loading the excavated mud into scows for disposal.

Timber Work

Piledriving cranes worked one side of a shipway at a time, installing piles for half the width (36 ft.), as this distance was as much as they could conveniently cover without moving out of their line of travel. Because of the variable driving



TRUCK CRANE equipped with 95-ft. boom and 10-ft. jib is employed by Bethlehem erectors to assemble tall tower cranes.

conditions encountered, the tops of driven piles formed an irregular pattern, standing up to different heights.

When driving had been completed across the width of a shipway, the piles in each bent were pulled into line by stay lashing with the aid of cables from hoist engines, heavy C clamps and steamboat ratchets. After being lined up between stay laths braced from adjacent bents, the pile tops were cut off to grade with air-powered Mall or Disston chain saws. For underwater cutting Wolf chain saws were used. Cap timbers then were placed in position on the piles, and holes were drilled and drift pins driven with Ingersoll-Rand pneumatic drills and hammers. A 7½-in. hole 2½ ft. deep was specified for the 1-in. drift pin 2½ ft. long used in connecting the cap timber to the piles. Shipway timbers were bolted and finished with the help of other power tools such as

(Continued on page 114)

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EXPERIENCE built it—PERFORMANCE sold it

(Continued from page 113)

Ingersoll-Rand pneumatic impact wrenches, Skilsaw electric saws and an American electric sander.

Concrete

All concrete was supplied by the Arundel-Brooks Co. in Rex and Smith 4-yd. truck mixers delivering from a waterside batching plant set up in a borrow area about 1½ mi. from the job. During the period of high-speed construction, concrete was placed on two shifts from 7:30 a.m. to 11:30 p.m. Week after week, the job maintained an average of 450 cu.yd. a day and placed up to 650 cu.yd. on some



20-TON TRUCK CRANE moves readily about job to unload and handle materials at various points

days. A fleet of fifteen mixers delivered the average day's requirements.

Practically all the 45,000 cu.yd. of concrete for the project, designed for 3,000-lb. strength, has been 5½-bag mix, substantially 1:2:4 by volume. A 7-bag mix was used in some duct line work.

As an example of the speed aimed for in concrete construction, the contractor's ideal schedule for a headhouse allowed only six days for the following operations: first day, excavate and cut off piles; second day, set footing forms and reinforcing steel; third day, finish forms, set remaining steel and place concrete footings; fourth and fifth days, erect forms for columns and deck and set steel; sixth day, place concrete columns and deck. Deck forms for the headhouses were supported on heavy posts and timber beams, providing clear spans between columns.

Most of the concrete on the project had to be placed from 1-yd. buckets handled by two diesel cranes of 2-yd. capacity, a Lorain and a P&H. A larger 2-yd. concrete bucket sometimes was used with one of the whirley cranes. Even in the crane-way footings, 70 per cent of the concrete had to be placed by bucket, as truck mixers approaching too close to the excavation caused the banks to cave. In constructing the utility tunnel, the contractor's engineers made a saving in form costs by

(Continued on page 116)

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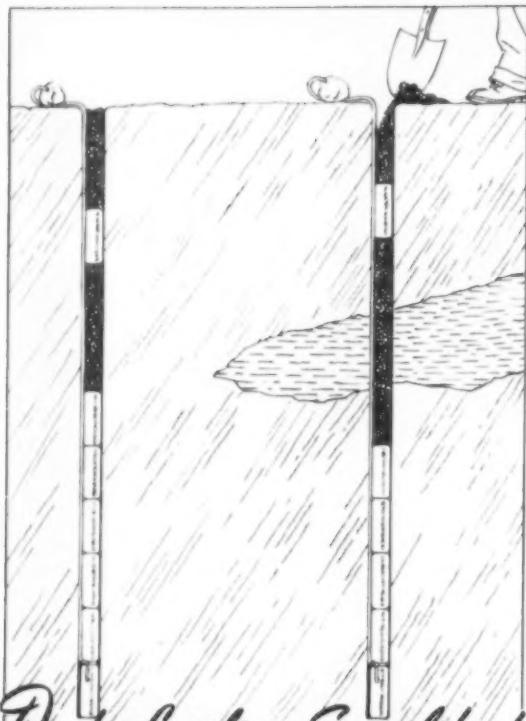
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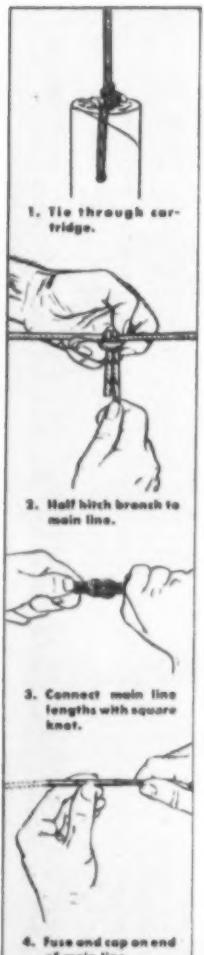
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Makers of Cordeau-Bickford Detonating Fuse—and Safety Fuse since 1836

(Continued from page 114)
using corrugated metal, left in place, for the roof concrete.

Structural concrete was vibrated internally with Viber flexible-shaft electric vibrators, of which there were six on the job. Portable generator sets were used at first to power these units, but later they were plugged into the light circuit.

Night Lighting

Several hundred 1,000-w. and 500-w. reflectors, in addition to ordinary lamps, lighted the work at night. The lighting load got so heavy that crews had to be careful to turn out lights in areas not working to save power for more productive uses. Among the most useful lighting units were ten portable skid-mounted towers 42 ft. high built on the job of light tubular posts and struts with angle-iron diagonal braces. Each tower carried four 1,000-w. floodlamps.

Labor Force

Working six days a week, the contractor has been operating on a three-shift basis, paying for three 8-hr. shifts, although only the first shift works 8 hr. and the remaining two work 7 hr. A total force of 2,500 workers at the peak of the job was distributed about 1,500 on the first shift, 700 on the second and 300 on the third. About 500 carpenters were employed.

Progress

In conformity with the schedule, the shipways were ready for keel laying on No. 1, April 30; on No. 2, May 14; on Nos. 3 and 4, June 21; on Nos. 5 and 6, July 15; and on Nos. 7 and 8, Aug. 4. Other shipways were expected to be completed on time, up to and including the final keel laying on No. 16 by Oct. 20.

A weekly meeting of Bethlehem-Fairfield engineers and Booth & Flinn representatives helped greatly to aid fast progress. At each meeting the conferees drew up a schedule of specific items to be completed during the following six days, and this schedule practically served as the working guide for all supervisory personnel.

Job Management

For the Bethlehem-Fairfield Shipyard, Inc., Baltimore, Md., construction of the project is under the direction of M. G. Hodgkinson, plant engineer; E. C. Lampman, assistant plant engineer; W. G. Windsor, Jr., field engineer; and R. W. German, assistant field engineer. The U.S. Maritime Commission is represented on the job by Lester E. Voss, resident engineer.

A. Rex Flinn is president of the Booth & Flinn Co., contractor, Pittsburgh, and J. C. Knee is chief engineer. Operations at the shipyard are directed by Karl C. Warner, superintendent; Frank Transou, assistant superintendent; L. I. Barkan, job engineer, inboard; and L. S. Stanley, job engineer, outboard. Moran, Proctor, Freeman & Mueser, of New York, are the consulting and designing engineers.

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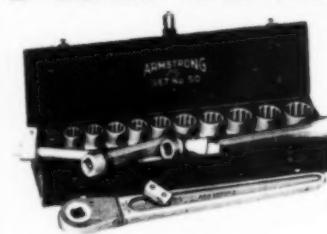
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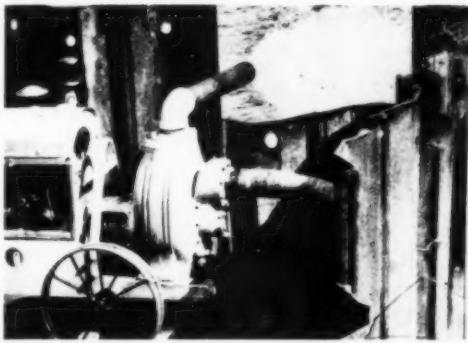
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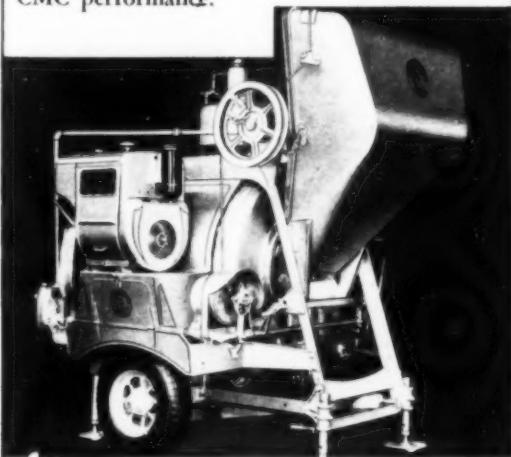
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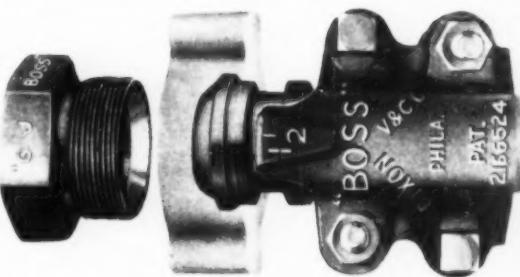
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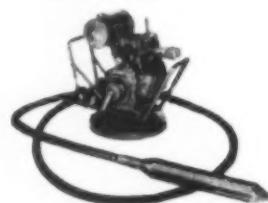
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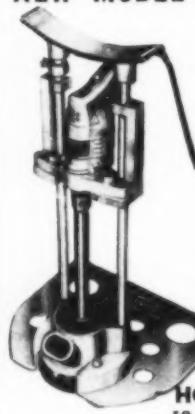
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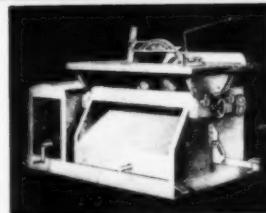
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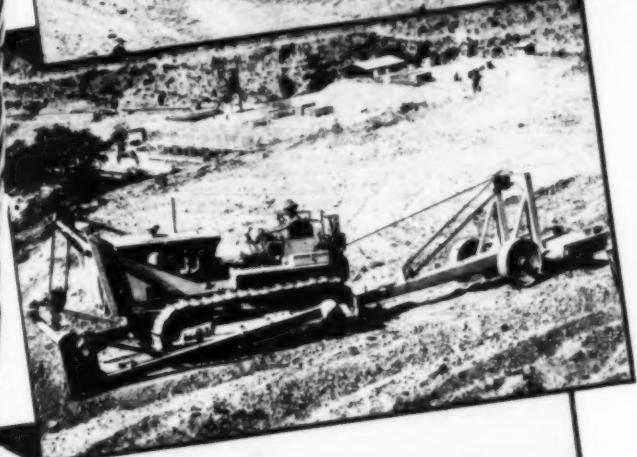
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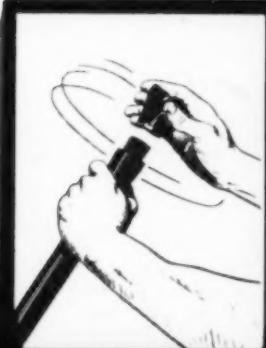


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